THE OIL WEEKLY

ENGINEERING « NEWS » STATISTICS

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The Oil Man's Calendar

OCT. 10–13	North American Gas Tax Conference, Tulsa, Oklahoma.
10–14	American Gas Association, Atlantic City, New Jersey.
10–14	National Safety Congress, Petroleum Section, Stevens Hotel, Chicago.
12–13	Indiana Independent Petroleum Association, Hotel Severin, Indianapolis, Indiana.
18	National Stripper Well Association and Oklahoma Stripper Well Association, Annual Meeting, Tulsa, Oklahoma.
19–21	Independent Petroleum Association of America, Tulsa, Oklahoma.
20–21	American Institute of Mining & Metallurgical Engineers, Petroleum Division and Industrial Minerals Division, Los Angeles, California.
27–29	Annual Convention, Texas Division, Mid-Continent Oil & Gas Assn., San Antonio, Texas.
NOV. 3–4	American Association of Petroleum Geologists, Pacific Section, Los Angeles, California.
14–18	American Petroleum Institute, (Annual), Stevens Hotel, Chicago.
DEC.	Mid-Continent Oil & Gas Assn., Standing Tax Committees, Dallas, Texas.

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This Week's Panorama

THE strong resistance that the crude oil market showed in recent weeks in the face of seriously declining gasoline prices was due undoubtedly to the exceptionally strict curtailment of crude production and the fairly moderate refinery operations.

With the strict curtailment prevailing, the crude price structure held up creditably, sinking only at scattered spots and intervals, and not wholly collapsing as in many instances in the past.

Even when the crude price cutting spread at the middle of last week to Arkansas and North Louisiana, with the announcement by Standard Oil Company of Louisiana of a general reduction of 17 cents a barrel in those areas, the general Mid-Continent crude market still displayed exceptional resistance. The only further weakness that the market showed immediately at that time was that involved in the 15 cent reduction of Oklahoma and Kansas crude prices by the independent company, Kanotex Refining Company. Large purchasers hesitated to extend the price reductions throughout the greater Mid-Continent, despite the weak gasoline market, in view of the extraordinary curtailment of crude production and low refinery runs and the fairly satisfactory inventory situation.

Recent Price Reductions

Crude price reductions that preceded those of last week included: the 10 cent reduction in Illinois, Indiana, and Western Kentucky; two cuts, totaling 11 to 15 cents a barrel, at Lisbon, North Louisiana; a 12 cent cut on Pennsylvania grade crude; and several others.

Gasoline tank car prices have declined sharply in recent weeks, and tank wagon and service station prices have come down similarly.

Latest Statistics Favorable

The gasoline market, much more largely than the other circumstances in the oil situation, apparently must be held responsible for the crude price reductions.

The statistics of the industry have continued generally satisfactory, week after week, and the latest figures were no exception. Under conservative allowables, the industry still is tightly controlling crude production and refinery operations, and it will do so further throughout October. Meanwhile, the industry continues to make some improvement in its inventory situation.

Crude oil production was brought down about 20,000 barrels in the week ended October 1, when it averaged 3,231,800 barrels daily, or 11.4 percent less than in the corresponding week last year.

Refinery runs of crude oil were increased 15,000 barrels daily in the week of October 1, to 3,235,000 barrels a day, but the runs were 4.9 percent lower than in the similar week last year.

Crude oil stocks continue to shrink in the week ended September 24, latest date for which figures are available, having decreased about 700,000 barrels, to a new low for modern times of 280,278,000 barrels. At that level they were 9 percent lower than a year previously.

Gasoline stocks continued to decrease contra-seasonally in the week ended October 1, having declined a few thousand barrels to 68,602,000 barrels. They were then 5.1 percent larger than a year before. The demand for gasoline in October is expected by the Bureau of Mines to be about 2 percent larger this year than last year.

Gas and fuel oil stocks continued their seasonal expansion in the week of October 1, increasing about 1,300,000 barrels, to 151,759,000 barrels, at which level they were 29.6 percent larger than at the corresponding time last year.

Crude Storage Survey

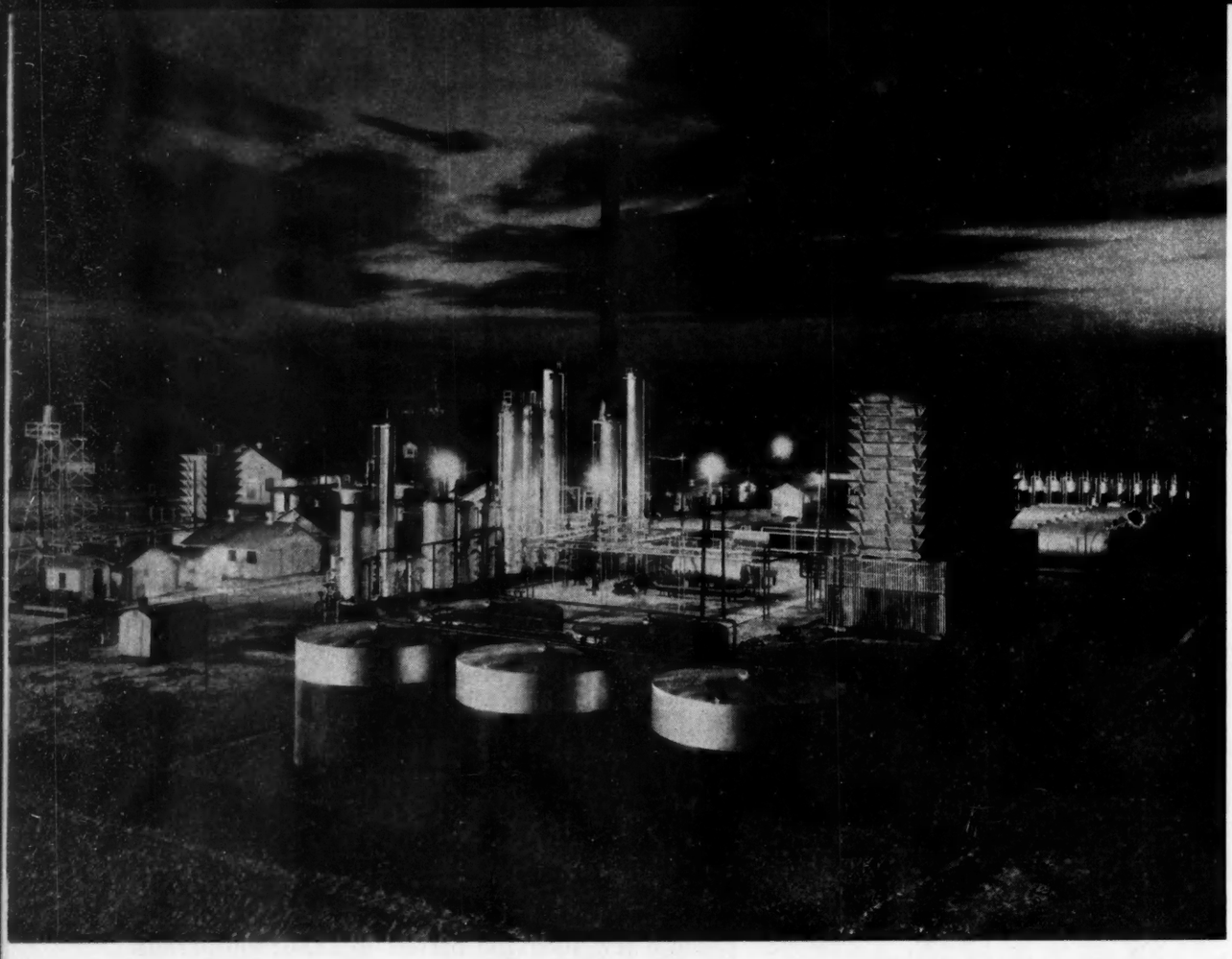
Unusually interesting was the comprehensive report on crude oil storage released lately by the Bureau of Mines, following a thorough study. As pointed out in a special review of the report that appears in this issue, the investigation indicated that 200,000,000 to 250,000,000 barrels of crude stocks would be sufficient, as against 280,000,000 barrels currently held.

In addition to the data on the quality of crude oil in storage and the desirable level of stocks, the report embodied appendices containing important information on crude oil tanks, crude oil pipe lines, and analyses of oils from pipe line systems.

Crude Oil Tanks

Total capacity of storage tanks for crude on June 30, 1936, was 583,478,000 barrels, exclusive of tanks for producers' (lease) stocks and of tanks used in California for storage of heavy crude and fuel oil. That represented a decline of 6 percent from the total of 620,505,000 barrels in the United States on May 1, 1931. The total number of crude oil tanks declined in the same period from 16,342 to 15,094, or about 8 percent.

In the interval between May 1, 1931, and June 30, 1936, total stocks of crude petroleum, less lease



The best industrial photograph of the year, chosen as the finest of its class by the National Photographers Association of America to be included in a book of 52 best prints and a traveling exhibition illustrating the most brilliant camera work of the past year. The picture was made by Carl E. Fehrenbach, Continental Oil Company photographer, at the company's Tepetate, Louisiana, repressuring plant.

stocks, decreased from 394,000,000 to 301,000,000 barrels, it was stated. As that decline was more than double the decline in tankage capacity, the amount of unused tank capacity increased materially. The total of empty storage capacity on June 30, 1936, was estimated at 260,000,000 barrels, contrasted with 187,000,000 barrels on May 1, 1931, an increase of 39 percent.

The total capacity for crude oil at pipe line stations on June 30, 1936, was 56,078,000 barrels, or almost 10 percent of the national total. Tanks at pipe line stations numbered 3390, and they had an average capacity of 16,542 barrels, contrasted with an average of 38,656 barrels for all crude oil storage tanks.

Tank farms on June 30, 1936, had a total of 8621 tanks with capacity of 423,136,000 barrels, or 73 percent of the total. The average capacity of those tanks was 49,082 barrels. Nearly all of the reduction in storage capacity since May 1, 1931, probably was at tank farms. A substantial part of the storage capacity that has disappeared from Oklahoma, Kansas and Texas since 1931 is accounted for by the demolition of a large number of old surplus tanks, particularly during 1935 and 1936, when there was a boom in the market for scrap steel. Advantage was taken of the unusually high prices that prevailed in those years (and that still prevail) to dispose of a large tonnage of steel plates and accessory material.

Contrary to the general trend, the capacity of crude oil tankage at refineries was expanded 23 percent between May 1, 1931, and June 30, 1936, or from 84,487,000 barrels to 104,264,000 barrels, and the number of tanks was increased from 2643 to 3083. The average tank size in 1936 was 33,819 barrels, about twice that of pipe line station tanks and two-thirds that of farm tanks.

The survey showed that on June 30, 1936, tanks with steel shells or walls had displaced all but negligible remnants of other types for the storage of refinable crude petroleum. Of the total capacity on that date, 580,170,000 barrels, or 99½ percent, were of steel, and only 3,308,000 barrels, or ½ percent, were wood, concrete, and earthen types of tanks.

Pipe Line Mileage

The survey revealed that the total length of crude oil pipe lines in the United States on June 30, 1936, was 110,580 miles, of which 57,820 miles were trunk lines and 52,760 miles were gathering lines. A slight decrease in mileage of both trunk and gathering lines took place after May 1, 1931, when a similar survey showed that there were 58,020 miles of trunk lines and 53,640 miles of gathering lines, or a total of 111,660 miles of pipe used in moving crude petroleum. In the 5-year period preceding May 1, 1931, the ratio of trunk line mileage to total mileage increased from 49 to 52 percent, with a corresponding decrease in gathering line mileage from 51 to 48 percent. The present survey indicates that these percentages for trunk and gathering lines have remained virtually constant since May 1, 1931, at 52 and 48, respectively.

Crude Stocks Indicated To Be Above Requirements

Comprehensive survey by Bureau of Mines indicates actual need for only 200 to 250 million barrels of crude stocks, compared with 280 million now held.

By L. J. LOGAN, Associate Editor

THE lately released report of the Bureau of Mines on crude oil in storage helps to explain the somewhat puzzling fact that the oil industry's markets have been alarmingly weak in recent weeks, in the face of strict curtailment of crude production and refinery runs and comparatively small inventories of crude and refined oils.

The report, published as Report of Investigations No. 3417, and entitled "Survey of Crude Oil in Storage, 1936-1937," strongly indicates that present market difficulties may be based in considerable part on still-excessive inventories of crude oil as well as on surplus stocks of gasoline and some other refined products.

For the report advances the deliberate opinion that the industry actually needs in storage no more than 200,000,000 to 250,000,000 barrels of crude oil, whereas the current stocks, amounting to about 280,000,000 barrels, have been regarded by many as wholly or largely justified.

Storage Needs Questioned

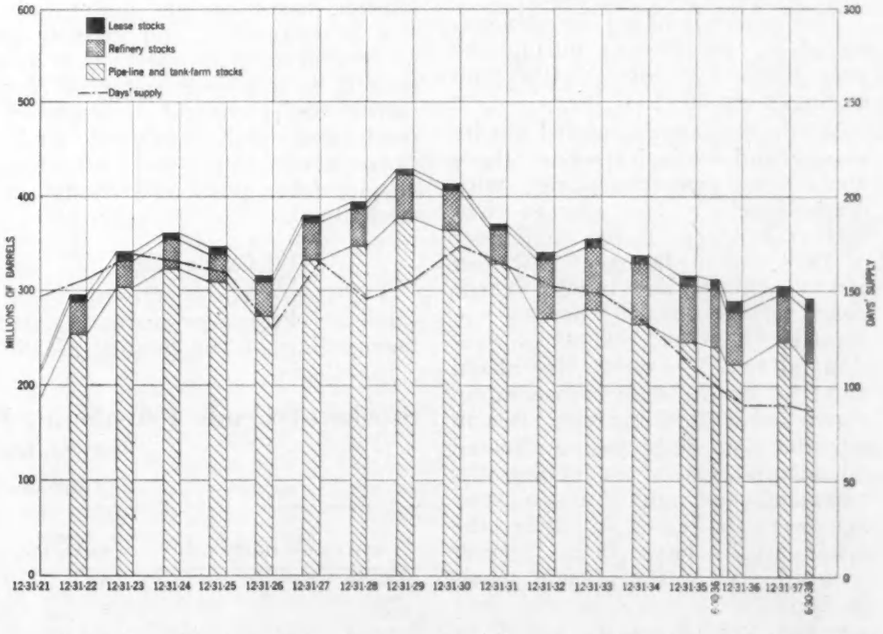
The question of how much crude oil storage is enough was raised nearly three years ago, when the stocks, after declining steadily for several years, were down almost to 300,000,000 barrels in the early part of 1936. At that time it was questioned whether the industry should reduce the inventories any further; whether it could continue to function freely and efficiently, and without shortages arising, unless the crude stocks were maintained around the levels then prevailing.

In that connection, it was suggested that substantial quantities of oil in storage probably represented old crude that was not suitable for manufacture into gasoline; that the stocks available for manufacture of currently needed petroleum products were considerably less than the reported crude stocks.

Prominent among those who said that crude storage possibly had been reduced enough was Colonel Ernest O. Thompson, of the Texas Railroad Commission and of the Interstate Oil Compact Commission.

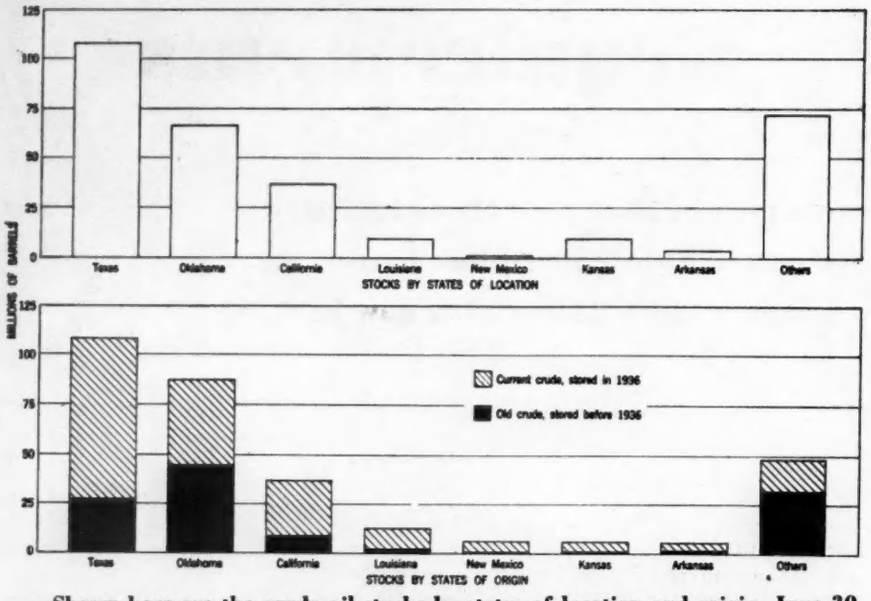
And out of the discussion at that time came the thorough in-

Crude Oil Stocks Have Been Steadily Reduced Since 1929



This chart shows crude stocks by principal types and days' supply, December 31, 1921, to June 30, 1938. While the stocks totaled 292,634,000 barrels at the end of June this year, they had been further reduced by September 24 to 280,278,000 barrels, the lowest level since 1922.

Where the Crude Oil Storage Is Located, and Whence It Came



Shown here are the crude oil stocks by states of location and origin, June 30, 1936. Particularly interesting is the lower half of the chart, showing stocks by states of origin, as it shows how much of the oil is current crude and how much old crude. The current crude, stored in 1936, largely fulfilled working stock requirements as of June 30, 1936; and the old crude, stored before 1936, was largely surplus oil, accumulated in past periods of overproduction and not needed for the normal functioning of the industry.

vestigation by the Bureau of Mines, on which the recently released report was based, Congress having appropriated funds for making the survey.

Basis for Report

The report is based on data collected by the bureau during the year beginning July 1, 1936 and ending June 30, 1937.

While the bureau carried out its survey and made its report, there was some experimenting with crude stocks. The storage was further reduced in the remainder of 1936 and in January, 1937, but after reaching a new low for recent years of 286,759,000 barrels on January, 31, 1937, crude production allowables were liberalized and the crude stocks rose again above 300,000,000 barrels. But in late 1937, as the recession affected oil demand, crude production was curtailed, and additions to storage were halted. In 1938 the crude stocks have been further reduced, and at the present levels of about 280,000,000 barrels, they are the lowest for 16 years, or since 1922.

Conclusion Surprising

Because the crude stocks have been reduced to the comparatively low levels, the industry has been complacent in regard to them, and somewhat disconcerting is the opinion of the federal bureau that additional withdrawals would be justified.

Nevertheless, the bureau's conclusion, based on the comprehensive investigation, and arrived at by several different methods of approach, is a strong argument for further strict control of crude oil production and continued withdrawals of crude from storage, despite the past reductions of stocks.

Old Crude Good

Two primary objectives of the crude stocks survey were: (1) determination of the quality of the stored crude, and (2) determination of desirable levels for crude stocks.

The bureau found that the older stocks, totaling about 117,000,000 barrels on June 30, 1936, were not greatly inferior, from the standpoint of potential gasoline, to the stocks stored in the first six months of 1936. This was because the original volatility of much of the older oil was superior to that of the average current production, and because much of it was stored in vapor-tight tanks. Consequently, the bureau stated, it would not be advisable to discount withdrawals of old oil from storage in balancing production with demand. Nevertheless, it was warned, crude should not be produced and stored unnecessarily, as storage tanks never will be as efficient as the original reservoirs.

Correct Quantity a Problem

In undertaking to ascertain the desirable levels of crude stocks, the Bureau of Mines found the problem difficult. Whereas proper levels of gasoline stocks are fairly well indicated by seasonal trends of demand and price fluctuations, it was stated, crude oil stocks in modern statistical times have always exceeded minimum working stock levels, and prices have reacted more to withdrawals or other factors, such as discovery rates, shut-in production, and underground stocks, than to the quantities of oil stored above ground.

Nevertheless, the bureau sought the answer to how much crude oil storage was desirable, and it took into consideration past determinations, the usual determinations based on days' supply, determination based on age of the oils, determination based on age and location, and determination based on types. The bureau also considered recent trends in stocks of crude oil and of products.

Stocks of Crude Petroleum, June 30, 1936, By Age Groups, by States of Origin

(Millions of Barrels)

STATE OF ORIGIN	Stored Before 1925	Stored 1925–30	Stored 1931–35	Stored 1936	Total
California	....	2.4	7.0	28.5	37.9
Texas	1.1	10.7	15.6	81.1	108.5
Oklahoma	14.6	9.8	19.9	43.5	87.8
Louisiana	1.4	....	.1	10.8	12.3
New Mexico	....	....	.4	5.7	6.1
Kansas	....	.1	.5	5.2	5.8
Arkansas	.6	.4	.4	3.7	5.1
Other States	21.3	4.3	6.9	12.7	45.2
Foreign	....	....	....	2.6	2.6
Total	39.0	27.7	50.8	193.8	311.3

Surplus Stocks Segregated

Having approached the subject from these various angles, the bureau stated that total stocks of crude oil may be subdivided into three economic groups: (1) minimum working stocks, (2) contingent reserves, and (3) unnecessary accumulations of stocks during periods of over-production.

At the time of the survey, it was found, the minimum working stocks of crude oil required for operation of the industry were approximately 105,000,000 barrels, which represented oil that did not remain in one place for more than a few days.

That amount included about 11,000,000 barrels on leases for maintaining adequate deliveries to pipe lines; 21,000,000 barrels actually contained in gathering and trunk pipe lines; 12,000,000 barrels contained in minimum working tanks for main trunk line operations; 10,000,000 barrels of essential terminal storage, at gathering line terminals, main line transshipment points, and main line terminals; 4,000,000 barrels in transit to domestic refineries by barge or tank ship; and 47,000,000 barrels at refineries, representing a minimum safety factor of about two weeks' supply.

In view of the characteristics of petroleum operations and the organization of the industry, however, it probably is necessary, according to the report, to have at least 100,000,000 barrels of contingent reserves above ground, in addition to the 105,000,000 barrels of true working stocks, to meet all of the industry's varied needs.

These figures indicated, therefore, that the industry needed working stocks of at least 200,000,000 barrels.

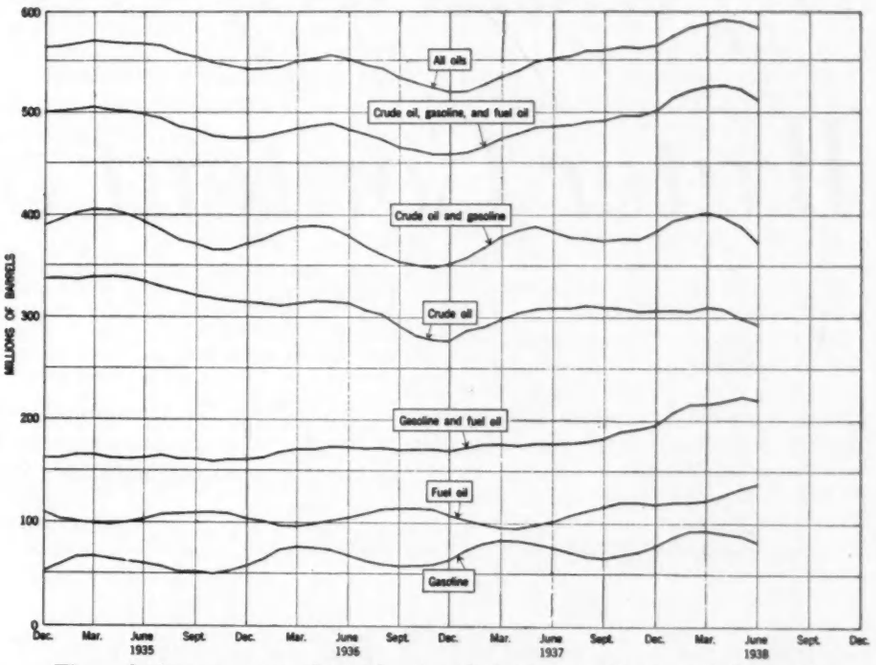
Types of Storage

Actually, on June 30, 1936, the total stocks amounted to 311,000,000 barrels, the industry having held 199,000,000 barrels in storage at tank farms, instead of the needed 100,000,000 barrels. The 311,000,000 barrel total was divided as follows:

Type of Storage	Net stocks, June 30, 1936 (Barrels)	[1]Days Supply
Lease	11,000,000	4
Pipe Line:		
In lines	21,000,000	7
In tanks	29,000,000	9
Refinery:		
At plants	47,000,000	15
In transit	4,000,000	1
Tank Farm	199,000,000	62
Total	311,000,000	98

[1]Based on average daily demand of 3,200,000 barrels for July, 1936.

Stocks of All Oils Largely Follow the Trend of Crude Oil Stocks



The only important products showing distinct seasonal changes in stocks are gasoline and fuel oil. But the changes for those two products are almost diametrically opposed; hence, the total for the two is virtually a straight line that trends upward because of the steady over-all increase in gasoline stocks. As stocks of other refined products in the aggregate show little change, the trend in stocks of all oils coincides largely with the trend in crude stocks.

Ages of Storage Oil

The total stocks of over 311,000,000 barrels of refinable crude oil on June 30, 1936, included approximately 39,000,000 barrels stored before 1925, when virtually no curtailment was practiced and when the discovery of a large field like Salt Creek was followed inevitably by a build-up of stocks; 27,700,000 barrels stored in the period 1925-1930, marked by the discovery of Seminole, Oklahoma City, and other prolific districts; 50,800,000 barrels stored from 1931 to 1935, the East Texas era; and 193,800,000 barrels of current stocks, stored in 1936.

The report stated that the 67,000,000 barrels of oil in the two older groups, nearly all stored in large tank farms and in the hands of a few large companies, obviously could not have much relation to working requirements.

The same reasoning might be applied, it was stated, to the 51,000,000 barrels stored from 1931 to 1935, although some of that oil might be classed as contingent reserves.

The report concluded, therefore, that at the time of the survey, the requirements for minimum working stocks and contingent reserves could be met from the current stocks of 194,000,000 barrels and an indeterminate part of the 51,000,000 barrels stored in 1931-1935. In other words, the minimum economic level of crude stocks at the time of the survey apparently was roughly between 200,000,000 barrels, the current oil, and 250,000,000 barrels, the current oil plus that stored in 1931-1935.

The report pointed out in conclusion that although the survey indicated a minimum of stocks ranging from 200,000,000 to 250,000,000 barrels as necessary, no exact level of desirable crude stocks could be fixed without a detailed analysis of individual company positions and policy and without more accurate information than that available concerning potential reserves and the extent to which a program of underground storage has replaced above ground storage. Without such information, it was stated, a considerable factor of safety in stocks undoubtedly is necessary in an industry in which production and demand are subject to such rapid change.

Influence of Oil Flow on Water Content of Sands*

Presented before the Petroleum Division of American Institute of Mining and Metallurgical Engineers, San Antonio, Texas, Oct. 5-7, 1938.

By NICO VAN WINGEN

THE occurence of oil and gas, in commercial quantities, is usually associated with indefinite geological structures. Only certain of the beds, however, that comprise such a structure are suitable for the retention of the oil and gas, and to these beds the term "oil reservoir rock" has been applied. In other words, crude petroleum is found trapped in these "reservoir rocks" and not in the formation where it originated. This implies that the oil and gas were expelled from their source beds, and migrated until an equilibrium of the acting forces has been established.

It is accepted generally today that during expulsion, migration and accumulation, the petroleum was in the presence of salt water native to the rocks. Accordingly, migration is a process involving the flow of oil through water-filled sands, and the subsequent accumulation process must require at least some replacement of water by oil in the sand pore spaces.

Until comparatively recent time, many petroleum technologists have held that the replacement of water by the oil in the sand was complete. However, this would be possible only if no forces other than that of gravity were to act on the fluids. In this hypothetical event, stratification of the fluids would occur in the order of their respective densities. But in actual oil migration and accumulation studies the important effect of the capillary forces cannot be neglected. As the result of many investigations, both field and laboratory, these capillary forces are known to prevent a complete separation of the fluids.

It is important to note that the presence of water in the sand need not be indicated necessarily by the appearance of water in the oil coming from wells producing from the sand. Some wells produce gas and oil exclusively from sands which apparently have 50 percent of their pore space occupied by water. A definite equilibrium is thus indicated between the capillary forces, that resist displacement, and those forces that favor it.

At the inception of this investigation little information was available to indicate to what extent the dynamical and physical properties of the sand and the displacing fluid affect an equilibrium between the capillary forces, and the forces tending to dislodge the water.

Hence, the intent of this research was to investigate the influence of the dynamical and physical characteristics of the sand and the displacing fluid on the amount of interstitial water, for a series of unconsolidated sands.

Selected Literature Review

The co-existence of water with the petroleum in natural oil reservoir rocks has long been known. An early reference validating this fact can be attributed to A. C. Lane,[1] who in the year 1909 employed the term "connate water" to designate the interstitial native rock water of sedimentation. It must be emphasized, however, that the connate water is not necessarily indigenous to the particular strata where it is found, as was pointed out in an early reference to this fact by Munn.[2] Muskat[3] explains that complex subsurface migrations take place, so that the water of the ancient seas, originally dispersed throughout the marine deposits may have been largely displaced by connate, or even meteoric water, migrating along permeable strata from relatively great distances. Thus the water in the sand associated with the oil is not necessarily "connate," but "residual" water.

In the following years a number of investigators,[4-11] presented adequate evidence of the existence of water in oil- and gas-bearing horizons and expressed the view that the expulsion of the oil from its source beds and the subsequent migration of the oil occurred in the presence of water.

Kemp[12] and Reeves[13] on the other hand, argued that strata under certain conditions might be entirely devoid of water, a contention which Versluys,[8] by analytical reasoning, proves to be incorrect.

Fettke,[14-15] in 1926, was one of the first to observe and evaluate quanti-

* The research work for this paper represents a portion of a thesis presented in partial fulfillment of the requirements for the Degree of Master of Science in Petroleum Engineering from the College of Mining of the University of California, Berkeley, California.

tatively the water content of actual cores taken from oil producing sands.

In the years to follow, the results of a number of quantitative analyses of oil sand samples were presented by various investigators.[16-20] Of these Pyle and Jones in particular presented adequate evidence to show that contrary to opinion expressed in earlier work, contamination of cores by drilling fluids is of comparatively little importance, and that the water found must be considered as being largely water native to the sand.

The interpretation of the results of a series of laboratory experiments performed in 1929 by Lindthrop and Nikolaeff[21] placed these investigators among the first to appreciate that a relatively high percentage of water might be associated intimately with oil in the sand pores even though wells producing from the sand yield only water-free oil.

Versluys,[23-24] on the basis of analytical reasoning, and Garrison,[22] by the application of colloidal theory, conclude that water will tend to occupy the smaller pores of the oil sand and may remain as a film on the grain or in a pendular condition around the contacts of the grains.

Only little work has been done on the problem of the flow of oil through water saturated sands. Most of the laboratory studies having been confined to the reverse process applicable to water flooding. However, the flow of oil through sands containing various amounts of water has been the subject of an experimental study by Dunlap,[25] who determined the effect of the interstitial water on the permeability of sands to oil.

Scope of Present Work

The problem of the flow of oil through water-saturated sands, involves a number of variables each of which has a definite influence on the results. In analyzing the problem it soon became apparent that there was no possibility of treating with thoroughness all phases of the problem within a reasonable time. Hence, only certain of the variables were considered for detailed study.

Mr. H. Pyle, petroleum engineer for Union Oil Company of California, suggested that in studying certain phases of the problem, emphasis should be placed on the practicality of the results so that they might lend themselves more readily to field-application. Mr. Pyle suggested in particular, that a firmly established relationship between the dry sand permeability and the amount of remaining water would be of practical value. Such a relationship has been established in this research; in addition the effect of the pressure under which the oil flows through the sand, had been determined; and the amount of retained water, as a function of properties of the oil, used as the displacing liquid, has been studied. The following experimental data were obtained:

1. The porosity of the water-free core.
2. The permeability of the water-free core, hereafter referred to as the "specific permeability" expressed in "darcys," following the notation by Dunlap.
3. The respective amounts of water retained, after oil has been flowed through initially water-saturated cores of various specific permeabilities and with the oil under a series of different pressure heads.
4. The permeability to oil of the cores containing these various amounts of interstitial water, hereafter referred to as the "effective permeability" (notation by Dunlap), expressed in "darcys."
5. The amount of water retained when a displacing liquid of different viscosity and specific gravity is used.

Apparatus and Procedure

A flow diagram of the experimental set-up is shown in Figure 1. Essentially, the flow system consisted of a core-holder, adapted to receive unconsolidated sand samples, and a pump, tubing and reservoir assembly arranged to maintain a flow of liquids through the core under any desired constant liquid head.

The flow through the core was vertically downward, as can be noted from the flow diagram. This arrangement was chosen purposely on the basis of preliminary tests which revealed that for downward flow the amount of water remaining in the core would be a true minimum. When the flow is vertically upward, comparative tests revealed a 155 percent increase in the amount of water remaining, while for horizontal flow the increase was 21 percent. These results are as might have been expected, as the gravitational force will assist in removing the water during vertically downward flow of the liquids.

For the displacing fluid, two liquids were used: commercial water-white grade of kerosene, and ice-machine oil, respectively. These refined oils were chosen, as they are relatively stable and contain no volatile fractions at the temperatures encountered during experimentation. The physical properties of the two liquids, especially of the kerosene are affected little by temperature changes and at room temperature their absolute viscosities are such that fair rates of flow through the sand can be obtained with relatively small heads of liquid. Care was taken that the displacing liquids were, in each instance, saturated with water prior to their introduction into the water-saturated core, as most oils and water are mutually soluble to the extent of 0.02 percent by volume at approximately 65° F., as was pointed out by Nutting.[26] Distilled water was used for saturating the cores in all tests.

The effect of an incomplete initial

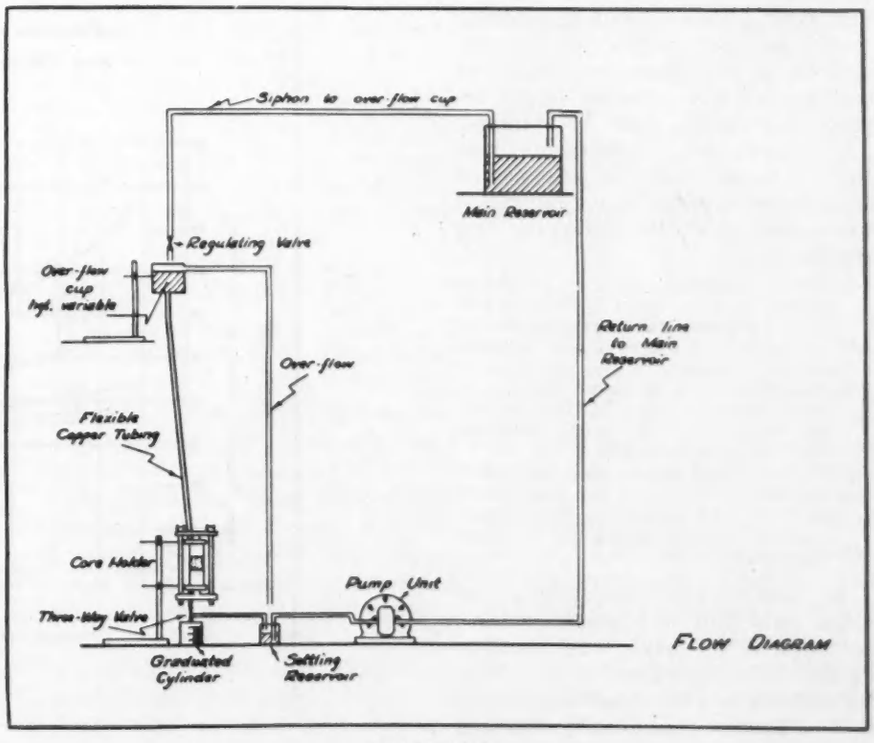


FIGURE 1

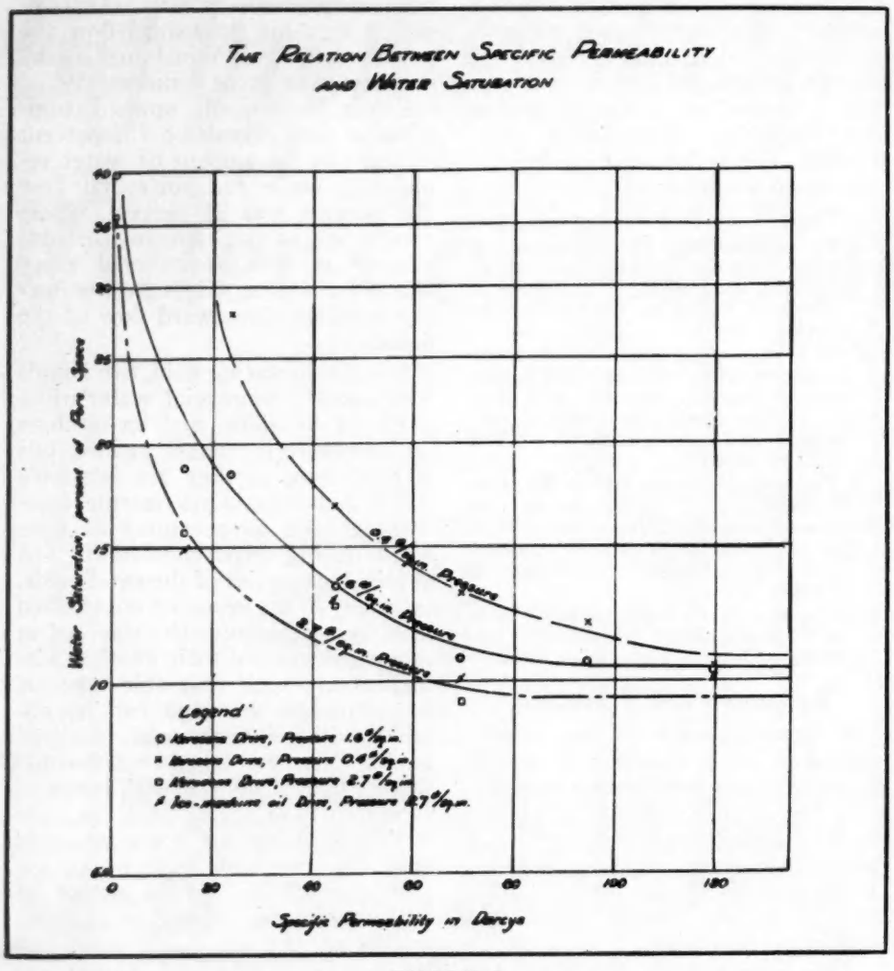

The Relation Between Specific Permeability and Water Saturation
Water Saturation, percent of Pore Space
Specific Permeability in Darcys
Legend

FIGURE 2

water saturation, prior to the oil drive, on the ultimate amount of water remaining in the core was investigated in some detail. In addition to this saturation effect it was also desired to establish by means of comparative tests whether or not reproducible results could be obtained.

Comparative experiments performed to ascertain the influence of an incomplete initial water saturation were made with the following test specimens:

1. Poorly saturated cores, in which an amount of water equal to the pore volume of the core was merely introduced at the top of the core and allowed to drain through.
2. Moderately well saturated samples, in which water in excess of the pore volume was added alternately with the sand to the core holder.
3. Well saturated samples, in which water was flowed through the core under pressure until a constant permeability indicated that all of the air had been removed.

In each instance the amount of water remaining in any sand, after a comparative oil drive, was found to be the same regardless of the initial water content. This indicates not only that results are reproducible, but that the amount of water retained in any one core is independent of the initial water saturation. Experimentally, this condition was helpful as work done by Dr. A. J. Carlson, of the University of California, (to be published) has shown that the amount of water contained in a sand core when introduced by different methods but in each instance to fill the pore volume, may vary relatively as much as 20 percent.

Because of the fact that no certainty could be had that the core would be completely saturated prior to a test, it was decided that a more accurate method would be to determine the remaining water content directly by distillation, using the standard method and apparatus as described in the A. S. T. M. manual test No. D95-30, rather than to compute it by subtracting the amount displaced from a saturated value equivalent to the pore volume. The initial saturation can be determined with certainty by checking amount of water held in core against the pore volume as determined by any one of several methods.

Several methods of obtaining the porosity of an unconsolidated sand sample were tried. The method finally selected, considered the most reliable and the easiest to perform, consisted in filling the core-holder, whose volume was accurately known, with a known weight of dry sand of known sand grain specific gravity.

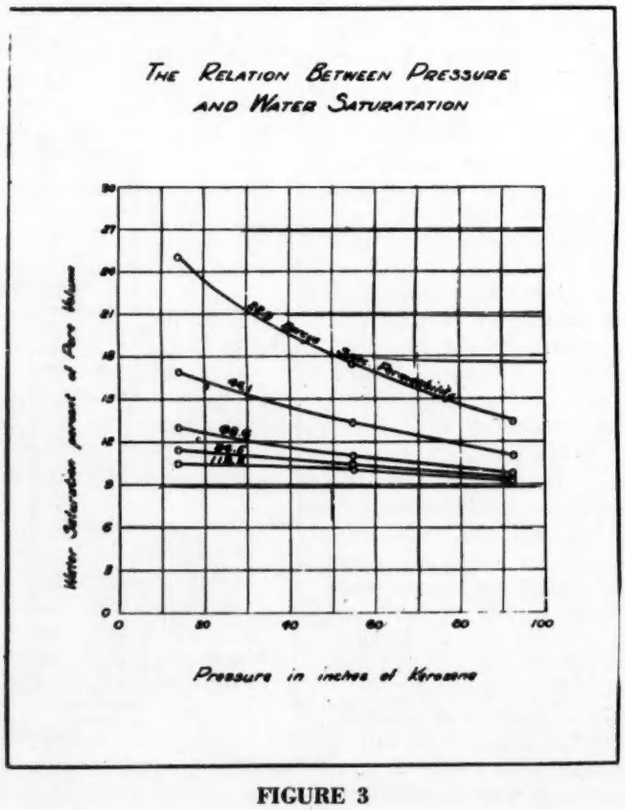

The Relation Between Pressure and Water Saturatation
Water Saturation percent of Pore Volume
Pressure in inches of Kerosene

FIGURE 3

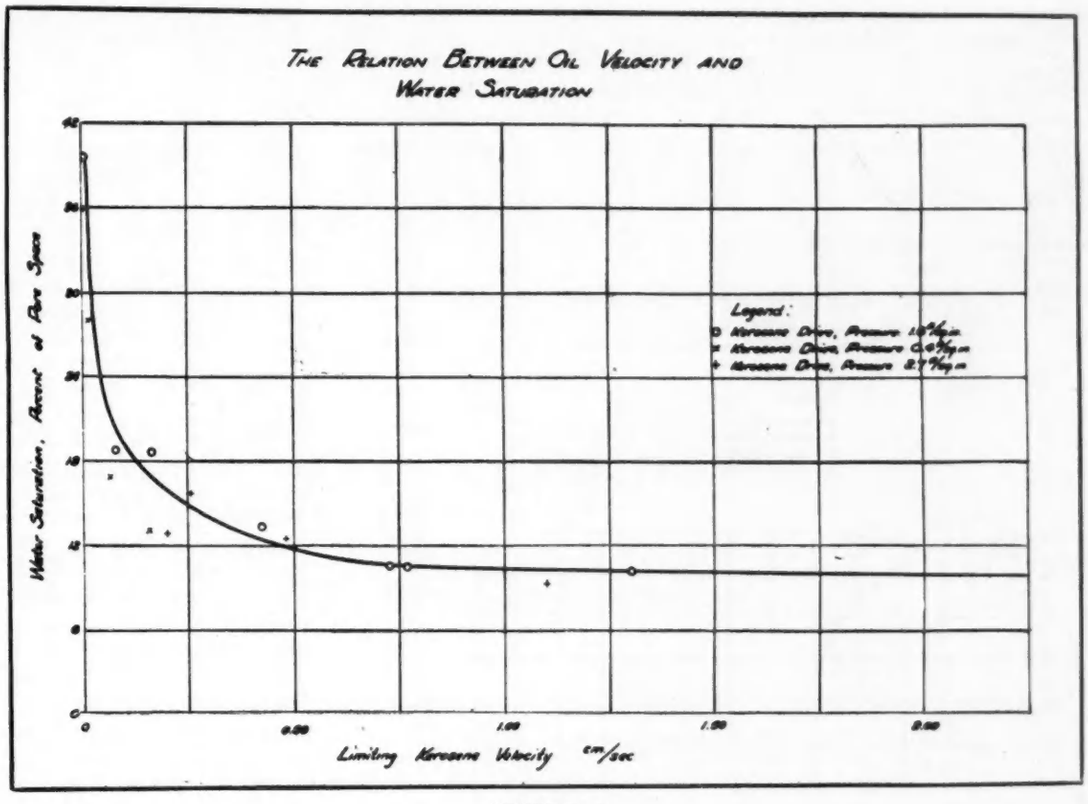


FIGURE 4

From this data, the porosity can then be computed. The complete experimental procedure can be summarized as follows:

1. The porosity of the core was determined by means of the method as outlined above.
2. The specific permeability of the core was determined by flowing kerosene under constant head vertically downward through the sand, which had previously been thoroughly cleaned and dried, until a steady rate of flow had been obtained.
3. An identical core (same type and size of sand, packed to the same porosity) was then saturated with water. Although as was pointed out on page 8, the degree of initial saturation is of no import, all cores were carefully saturated, by flowing water through the core under pressure until a constant permeability indicated that all of the air had been removed.
4. Kerosene under constant head was flowed vertically downward through the core, until no water appeared in the discharge stream, and until the effective permeability was constant.
5. The amount of water remaining in the core was determined by distillation, using the standard A. S. T M. No. D95-30 water determination method as described on page 9.

The foregoing procedure was repeated for a series of cores of different specific permeabilities. Next, all the cores were tested under a series of different pressure heads of kerosene and finally, ice machine oil was substituted for the kerosene and the tests repeated.

In calculating the pressure drop across the core, the friction-loss in the ⅛-inch copper feed-line was considered to be negligible because of the prevailing low rates of flow.

It was important that the temperature of the displacing liquid be observed during the flow tests as the absolute viscosity of kerosene at room temperature changes 0.5 percent per 1° F. change in temperature and hence the permeability calculations would be in error by an equal amount when temperature is not considered. For ice-machine oil the effect is much greater, the variation of absolute viscosity under similar conditions approximating 4 percent per 1° F.

Results

The experimental results are graphically presented in Figures 2, 3, 4 and 5.

Figure 2 shows the relations between the specific permeability and residual water saturation, obtained by flowing kerosene under three different constant heads through a series of unconsolidated cores. In addition, results of experiments are presented in which ice-machine oil was used as the displacing liquid. A definite correlation between the dry core or specific permeability and the amount of interstitial water is indicated. The relation is inverse, that is, the water saturation is greatest for cores of lowest specific permeability. The influence of the permeability on water content is most pronounced when the specific permeability is lowest. In this region the curves when extrapolated appear to approach 100 percent water saturation for zero specific permeability.

For the highest permeability cores investigated, it is of interest to note that for all three pressures the amount of remaining water is nearly the same. This may be explained by the fact that in this region each liquid head was sufficient to displace most of the capillary held water so that the only other remaining water existed as a thin film around the grains and was retained. Further reduction in water content would occur only if pressures were sufficiently high to cause a "stripping" of the grains. However, if there exists a greater molecular attraction between the sand grains and the water than between the sand grains and the oil even a high pressure difference would not remove all of the water. Physical limitations of the apparatus prevented the attainment of pressure heads sufficiently high to check this point.

Except for this limiting case it is to be noted that the pressure head under which the displacing liquid flows has a direct bearing on the amount of remaining interstitial wa-

ter. The water saturation being greatest for the lowest pressures. The effect of changes in pressure is most pronounced for cores of low specific permeability.

Another point of interest to observe, is that the substitution of a more dense and more viscous oil in

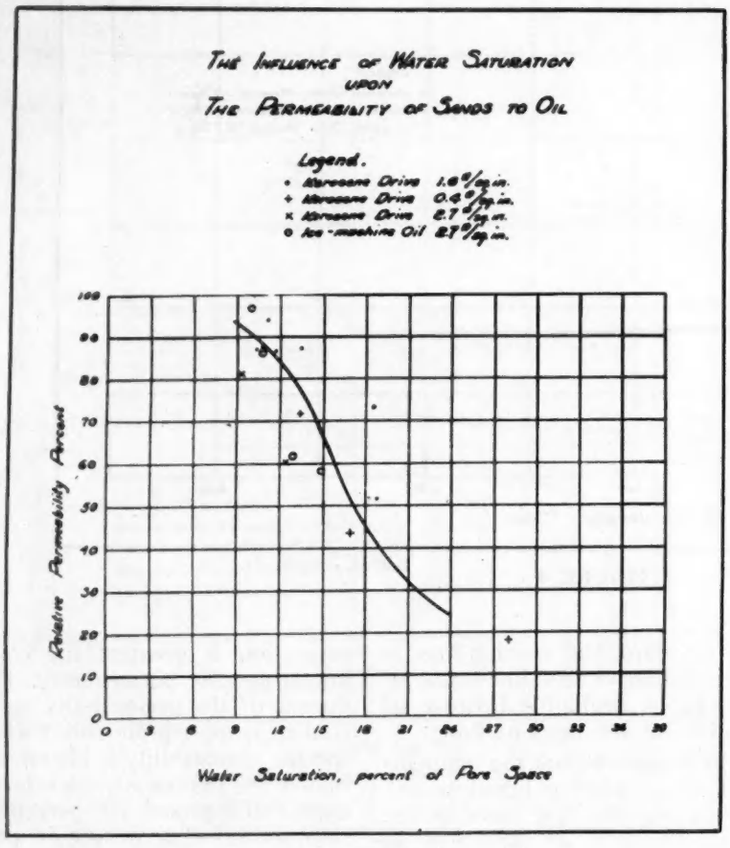


FIGURE 5

place of the kerosene did not result in a change of percentages of water remaining in the sand. Evidently, within some definite range of oil viscosities the amount of water retained is a function only of the pressure and the rate of oil flow. If it could be possible to attain a condition of flow with an extremely viscous liquid the effect of the liquid moving more as a body probably would be reflected by a lesser amount of remaining water. Likewise for displacing oils of very low viscosity, the residual water percentage might be higher. The importance of gas as a displacing fluid is appreciated. However, in a study of gas flow through sands containing water other influencing factors enter, which place the subject outside of the scope of this report.

The inverse relationship between the permeability and the water content of the sands serve to corroborate the views of Versluys[23-24] and Garrison[22] that the degree to which oil displaces "connate" water out of the pore spaces of oil-bearing sands is limited by the size of the pores.

The following analytical deduction will serve to illustrate this point. Although no relationship exists between permeability and porosity, for all sands the permeability is generally related to the size of the pore spaces. From Poiseuille's and Darcy's law, it can be shown that for any given porosity the permeability varies as the square of the effective pore diameter. If then, Versluys' view be correct, the water content should bear this inverse relationship with the permeability.

Figure 3 shows the relation between the pressure gradient causing oil flow through the water-wet sand core and the amount of water remaining. It can be seen (also noted from Figure 2) that the effect of a change in pressure is more easily discernible for the sands of lower permeabilities. The tendency of these curves to group together and their flattening off in the neighborhood of 10 percent water saturation, corroborates the above statement that once the "stripping" stage of the sand is reached, considerable increases in pressure will be necessary in order to remove any appreciable quantities of water. Further experimental data are needed to fully substantiate this statement.

The effects of the permeability and the pressure gradient on the amount of interstitial water have been shown. This data also can be expressed in terms of a single variable, the velocity, which is a function of both the permeability and the pressure gradient.

Figure 4 shows the influence of the apparent linear velocity of the displacing liquid on the amount of water that is not displaced from the sand by the oil. It is to be noted that the velocity figures shown are not truly representative of the actual pore velocities. The apparent linear velocity used in this report is computed by dividing the volumetric rate of oil flow by the product of the cross-sectional area of the glass tube, the sand porosity, and the fractional oil saturation. The velocity so obtained approximates the average rate of flow in the average capillary, close enough for present purposes.

Obviously, as the velocity expresses the combined effect of a variation in permeability and pressure gradient, we find, as before, that the percentage of water saturation is greater for lower displacing liquid velocities.

The curve approximates a hyperbola, appearing to have as asymptotes zero kerosene velocity and approximately 10 percent water saturation. This near constancy of the residual water content for high oil velocities supports the explanation given for Figures 2 and 3 that water-saturations of 10 percent or less represent only water existing as adherent films encasing the grains. For further removal of water greater pressure differences would be essential to accomplish the stripping, although in no case could all the water be removed, and it is logical to expect the limiting kerosene velocity to remain constant once stripping has begun.

It is of interest to note that in Figure 4 showing the variation of residual water saturation with kerosene velocity, all the points plotted from many experiments in which different sands were used, were common to one curve. Dunlap,[25] in presenting a water saturation versus apparent kerosene velocity relation for three sand cores of different specific permeabilities, found it necessary to draw a separate curve for his least permeable core (3.0 darcys), while the other two (4.5 and 8.0 darcys respectively) had common points. The curve for the least permeable core presented by him also approaches approximately 10 percent

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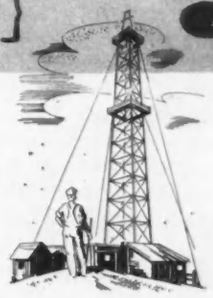

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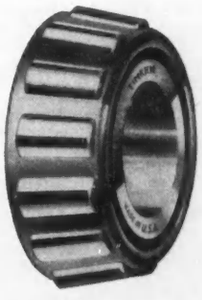

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water saturation as an asymptote, while the curve for the higher permeabilities asymptotically approaches approximately 15 percent. Dunlap computed the amount of remaining water by subtracting the water driven out of a core from 100 percent initial water saturation of all the sand pore space. As was pointed out above, (see apparatus and procedure, such an assumption in regard to the initial water saturation of the sand may be in error and it is believed that the remaining water for his more permeable cores actually may have been less than shown. If the remaining water were less, he also could obtain one curve with approximately 10 percent water saturation as an asymptote.

Figure 5 shows the influence of water saturation on the relative permeability, where relative permeability, as defined by Hassler,[27] is the ratio of the effective permeability to the specific permeability.

Dunlap,[25] who established this relationship, found that for a core of any definite specific permeability a separate curve could be drawn. All curves, however, fell within a comparatively narrow range, and there was no indication that the relationship is a function of the specific permeability of the sand, as the curve for the most permeable sand lay between the other two. As the present investigation was not performed with the particular objective of obtaining a relative permeability versus water saturation relationship, the data is not such that a segregation by sand type can here be made. The curve presented is merely a composite for the values obtained from all the sands. In general, it substantiates the results obtained by Dunlap, showing that as the volume of water in the voids exceeds approximately 12 percent of the pore space, the permeability of the core to oil is reduced markedly until at 30 percent residual water saturation the permeability is only about 20 percent of the specific permeability of the core.

It is of interest to compare these results with those obtained by Hassler,[27] who investigated the recovery of oil from sandstone by means of an air-drive. His curve showing the influence of oil saturation on the relative permeability of the core virtually is identical with the relationship established here for water and kerosene. This suggests that the relation may be independent of the fluids used and that, in general, the effect of the presence of any fluid A in an unconsolidated sand on the permeability of the sand to a fluid B would be the same as shown by the curve in Figure 5, provided the fluids A and B are immiscible, and that we are not to deal with a fluid of extreme viscosity.

The experimental results obtained should be fairly accurate. The principal source of error was in the determination of the total void space in the sand-filled core-holder. Any error here would be reflected in the percentage figures of remaining water. Comparative tests showed, however, that the error from this source should not exceed 5 percent.

Conclusions

The experiments from which the following conclusions have been drawn were performed with distilled water, unconsolidated sand, and "dead" oil. Therefore, the results presented should not be considered as being necessarily identical to those that would be obtained under natural petroleum reservoir conditions.

Bearing this restriction in mind, the following conclusions may be drawn:

1. When oil under constant head is flowed through an unconsolidated sand, the amount of water retained in the core is inversely proportional to the specific permeability of the core. This corroborates the view that the degree to which oil displaces water out of the pore space is limited by the size of the pores.
2. For the range investigated, the displacing action of a more viscous oil of higher specific gravity was found to be the same as for a less viscous oil, of lower specific gravity.
3. The amount of interstitial water retained in the sand bears an inverse relationship to the pressure head of the displacing liquid.
4. The degree of retained water saturation of the sand appears to approach 100 percent as the specific permeability approaches zero.
5. For the higher values of specific permeability and for the pressure range investigated the remaining amount of water in the sand occupies approximately 10 percent of the pore space. This, together with the fact that the limiting oil velocity curve approaches approximately 10 percent water saturation as an asymptote, indicates that beyond this point further removal of water is achieved only by a stripping of the grains requiring considerable pressure drops across the sands; or by a balancing of the molecular forces.
6. As the water saturation of the sand exceeds approximately 15 percent of the pore volume, the permeability of the sand to oil decreases rapidly. This corroborates the results obtained by Dunlap.[25]
7. Sands with water saturations as high as 40 percent were found to produce 100 percent oil. This confirms previous ideas on the subject based on laboratory examination of cores.

Acknowledgment

The writer wishes to express his thanks and appreciation to Dr. A. J. Carlson, of the University of California, Mr. Howard Pyle, of Union Oil Company, and Mr. Frank G. Miller, of the U. S. Bureau of Mines, for their many helpful suggestions and constructive criticism.

Bibliography

[1] Lane, A. C., "Mine Waters and Their Field Assay," Bull. Geol. Society of Am., Vol. 19, p. 502, 1909.

[2] Munn, M. J., "Geology of the Oil and Gas Fields in the Sewickley Quadrangle, Pa.," Penn. Top. & Geol. Survey Comm., Report 1, p. 85, 1910.

[3] Muskat, M., "Flow of Homogeneous Fluids Through Porous Media," (McGraw-Hill, 1937), Chapt. I, p. 40.

[4] Johnson, R. H., "The Role and Fate of Connate Water in Oil and Gas Sands," Trans. A.I.M.E., LI, pp. 587-592, 1916.

[5] Mills and Wells, "The Evaporation and Concentration of Waters Associated with Petroleum and Natural Gas," U. S. Geol. Survey Bull. 693, p. 67, 1919.

[6] Mills, R. Van A., "Relation of Texture and Bedding to the Movements of Oil and Water Through Sands," Econ. Geol. 1921, 16, pp. 124-141.

[7] Ambrose, A. W., "Underground Conditions in Oil Fields," Bur. of Mines Bull. 195, pp. 106-120, 1921.

[8] Versluys, J., "The Problem of Dry or Unsaturated Strata," Proc. Kon. Acad. Van Wetenschappen, Amsterdam, Vol. XXXIV, No. 5, 1931.

[9] McCoy and Keyte, "Problems of Petroleum Geology, 253," Bull. Am. Assoc. Petr. Geol., 1934.

[10] Torrey, P. D., "Problems of Petroleum Geology, 467," Bull. Am. Assoc. Petr. Geol., 1934.

[11] Brace, "Factors Governing Estimation of Oil Reserves in Sand Fields," Bull. Am. Assoc. Petr. Geol. 1934, 18, p. 343 and 1081.

[12] Kemp, J. F., "Waters, Meteoric and Magmatic," Mining and Scientific Press XLVI, pp. 705-708, 1908.

[13] Reeves, F., "The Absence of Water in Certain Sandstones of the Appalachian Oil Fields," Econ. Geol. XII, pp. 354-378, 1917.

[14] Fettke, C. R., "Core Studies of the Second Sand of the Venango Group from Oil City, Pa.," Petr. Dev. & Tech. A.I.M.E., p. 228, 1926.

[15] Fettke, C. R., "Core Studies of the Bradford Sand from Bradford Field, Pa.," Trans. A.I.M.E. (Petr. Div.), pp. 221-37, 1928-1929.

[16] Horner, W. L., "Determination of the Oil Content of Sands for Water Flooding," Petr. Eng. 6, 7, pp. 33-35, April, 1935.

[17] Horner, W. L., "Contamination of Cores by Drilling Fluid," Oil Weekly, 78, 3 pp. 29, July 1, 1935.

[18] Lewis and Horner, "Interstitial Water Saturation," Oil Weekly, Oct. 19, 1936.

[19] Pyle and Jones, "Quantitative Determination of the Connate-Water Content of Oil Sands," Oil Weekly, p. 46, Nov. 16, 1936.

[20] Schilthuis, R. J., "Connate Water in Oil and Gas Sands," Petr. Technologist, A.I.M.E., Feb., 1938, Tech. Pub. No. 869.

[21] Lindtrop and Nikolaeff, "Oil and Water Content of Oil Sands, Grozny, Russia," Bull. Am. Assoc. Petr. Geol. Vol. 13, p. 81, 1929.

[22] Garrison, A. D., "Selective Wetting of Reservoir Rock and Its Relation to Oil Production," A.P.I. Drilling and Prod. Practice (1935), p. 133.

[23] Versluys, J., "Compaction, an Agent in the Accumulation of Oil at the Anticlines," Proc. Kon. Aca. van Wetenschappen, Vol. XXXIII, No. 9, 1930, p. 990.

[24] Versluys, J., "Grondwaterbeweging als Factor in de Accumulatie van Aardolie," De Ingenieur 1930, No. 52, Mynbouw 5, pp. M 25.

[25] Dunlap, E. N., "Influence of Connate Water on Permeability of Sands to Oil," Petr. Technologist A.I.M.E. Feb., 1938, Tech. Pub. No. 874.

[26] Nutting, P. G., "Geochemical Relations Between Petroleum, Silica, and Water," Econ. Geol. (1926) 21, p. 234.

[27] Hassler-Rice and Leeman, "Investigation on the Recovery of Oil from Sandstones by Gas Drive," Trans. A.I.M.E. 118, 1936, p. 116.

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NEW GEOPHYSICAL METHOD OF PROSPECTING FOR OIL AND GAS:

Ground Gas Survey Is Promising Tool

By SYLVAIN J. PIRSON,
Department of Petroleum and Natural Gas Engineering,
The Pennsylvania State College

Conclusions

To date the soil gas survey method of prospecting for oil and gas is little known in the United States of America, although several organizations, oil companies and consulting firms are using it commercially in the field. The main value of the method appears to be in conjunction with other geophysical methods, particularly the seismograph and the gravimeter since the gas survey determines positively if oil or gas is associated with the structures discovered and if these are worth a drill test.

The soil gas survey has great advantages over the previously known geophysical prospecting methods in that it is able to discover oil and/or gas **directly,** even when the reservoir is of the so-called **stratigraphic trap,** such as the East Texas field, which could never have been discovered by the seismograph or gravimeter. Recent soil tests by a major oil company over the East Texas field have proved definitely its applicability to this type of structure.

The gas survey is a new, promising tool in the hands of experienced geologists; it will perhaps see a brilliant future in the art of prospecting for new reserves of oil and gas.

PERHAPS the reader will be misled by the above title, as the method with which this article deals actually is not new nor may it be called properly a geophysical method. The method has for its fundamental principle the chemical analysis of underground gas from seepages near the surface of the ground and, in this respect, is one of the oldest methods of prospecting for oil and/or gas. Properly, it should be referred to as a *geochemical method of prospecting,* and references appear in the literature under this name. Nevertheless, the methods of analysis most effectively used are physico-chemical in nature and in some cases strictly physical, thus it may not be out of place to classify this procedure with the accepted methods of geophysical prospecting. Now as to the novelty of the application, while it has become generally known of in the United States only during very recent years, it is an old procedure. In the earlier days of prospecting for oil, the analysis of gas seepages from the ground was confined to establishing the presence of heavier hydrocarbons which in itself is an indication of a petroleum accumulation at depth. Such seepages usually occurred along fault planes and the source of gas, in many cases, was to be found at considerable distance, both horizontally and vertically, from the surface manifestations. The geologist was called upon in order to establish the most likely location of the source formations and determine the location of a test well. With the advent of research in this field it was found that gas not only follows the lines of least resistance in its continuous escape toward the surface but that gas under pressure travels through apparently consolidated and homogeneous rocks in a continuous manner and, above an oil and/or gas field, an effusion

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of hydrocarbon gases into the atmosphere takes place continually. To be sure the amount of gas diffusing through a unit area is necessarily small, hence the high degree of precision required in the analysis of the underground air for traces of hydrocarbon gases.

To the physicist, it does not appear difficult to explain the presence of hydrocarbons in the ground air above an oil field although the latter may be covered by thousands of feet of overburden. In fact there are three ways according to which gases may travel from the reservoir to the surface of the ground: 1. by permeation, 2. by effusion, and 3. by diffusion.

1. Permeation

Rocks being made most generally of crystalline grains more or less cemented together have in their volume a certain percentage of void space or channels which is known under the term porosity. The existence of porosity in rocks is the reason for their ability to retain fluids (i.e., oil and/or gas) and to let these fluids circulate more or less freely under the influence of a pressure gradient in the formation. This ability of a porous medium to permit fluid to circulate through intercommunicating channels is known as the *permeability* of the medium; this is a physical characteristic of rocks which is readily measured in the laboratory and is usually expressed in darcies or millidarcies. A rock is said to have a permeability of one darcy when a sample of that rock is cut in such a manner that it will present a cross section of one square centimeter to the direction of flow, has a length of one centimeter, and under a pressure differential of one atmosphere will permit the flow of one cubic centimeter per second of a fluid having a viscosity of one centipoise and under conditions of viscous flow. In order that the reader may have a clearer idea of the variations of permeabilities in various rocks Table 1 is given.

FIGURE 1

Hydrocarbon distribution in the soil above fault covered by an overburden.

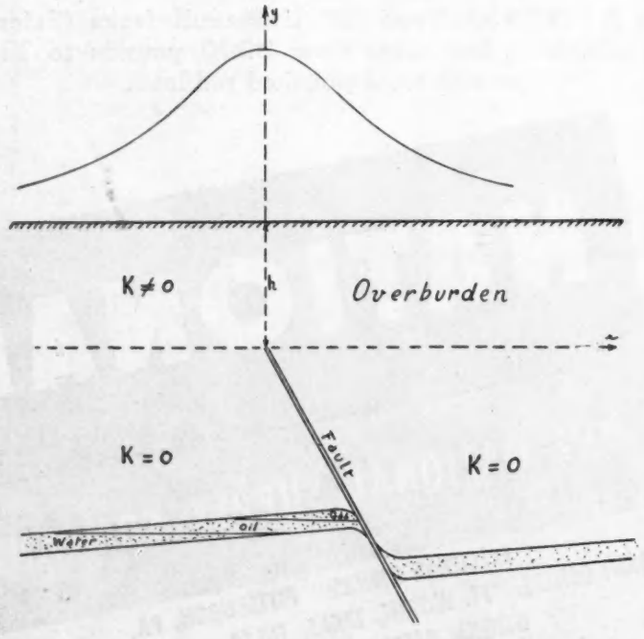

TABLE 1
Variations of Permeability in Various Rocks

ROCK	Average Permeability
Average Bradford Sand (Pennsylvania)	.5 mD to 10 mD
Average Woodbine Sand (Texas)	20 mD to 3000 mD
Average Wilcox Sand (Oklahoma)	75 mD to 350 mD
Limestone	0 mD to 1 mD
Shale	0 mD to 1 mD

It is seen that permeability is a widely variable physical characteristic. In computing the average permeability of the overburden above a reservoir it is necessary to take into account the permeability and thickness of the individual formations. It can be shown that such a quantity may be calculated by the following formula:

$$K = \frac{\sum_{i=1}^{n} h_i}{\sum_{i=1}^{n} \frac{h}{K_i}} \qquad (1)$$

where K is the overall permeability, h_i is the thickness and K_i the permeability of any one of the beds overlying the reservoir. It may be seen from (1) that if one of the beds is totally impervious ($K_i = 0$), the value of K will also be zero. This naturally occurs in the oil fields where the retainer beds are shales with very small permeability. Water horizons similarly show very poor permeability. It appears somewhat doubtful that permeation is a very important contributing factor toward the concentrations in hydrocarbon gas as actually observed in the surface soil since shale beds and water horizons are always present above oil reservoirs. Hence one must look toward other phenomena in order to explain the presence of hydrocarbon gas in the soil air.

However permeation of hydrocarbons from the reservoir may take place through openings such as faults, jointing, etc., and in this respect it is necessary to mention it. Let us consider Figure 1, which represents a fairly common type of oil accumulation along the Balcones Fault Zone. Due to shattering of the rocks, the fault zone will have a fairly high permeability, thus permitting an abundant gas seepage. The overburden usually is unconsolidated and consequently highly permeable. Hence the problem of detecting the presence of a fault in relation with an oil reservoir reduces to the problem of calculating the rate of efflux of the gas through the overburden for a line source. This may be solved very readily by means of D'Arcy's Law which states that the mass rate of flow (V) of the gas is proportional to the permeability of the medium (K), the pressure gradient $\frac{\partial p}{\partial z}$, the density of the gas γ and inversely proportional to the viscosity of the flowing gas (μ):

$$V = -\frac{K\gamma}{\mu}\frac{\partial p}{\partial z} \qquad (2)$$

Applying this law to the system represented in Figure 1 it may be proved that, for an infinitely long

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fault outcrop of width 2ϵ and for a depth h of burial under an overburden of permeability K, the distribution of the mass velocity of efflux along a profile crossing the fault will be:

$$V = -\frac{\pi K \gamma_o p_s^2}{4 h \mu p_o \ln \frac{\pi l}{4h}} \times \frac{1}{\cosh \frac{\pi \alpha}{2h}} \qquad (3)$$

expressed in grams per square centimeter per second and where γ_o is the density of the gas at standard condition, μ is the viscosity and p_s is the pressure of the gas at the outcrop underneath the overburden. The distribution of the concentration in hydrocarbons in the surface soil will be according to the curve shown in Figure 1. Equation 3 gives furthermore results which one would have expected otherwise, mainly: larger soil concentrations may be expected when the overburden is thin (h small), and when the pressure p_s of the gas is large.

Equation 3 permits further to calculate the approximate values of hydrocarbon concentrations which one may expect to observe in the ground near the surface. Let us consider a soil with 30 percent porosity, an overburden 100 meters (about 328 feet) thick, an average permeability of .001 darcy. Let the gas be pure methane of a viscosity of .0185 centipoise at a pressure of one atmosphere at the fault. Thus the maximum velocity of efflux through the surface of the ground will be for a width $\epsilon = 1$ meter:

$$V = -\frac{\pi \times .001 \times .5544 \times .0012 \times 2^2}{4 \times 10000 \times .0183 \times 1 \times \ln \frac{\pi}{400}} = 1.95 \times 10^{-10} \text{ gram/cm}^2\text{/sec.} \qquad (4)$$

Thus the maximum concentration in the soil air will be, assuming that the renewal of soil air by aeration is faster than the gas leakage:

$$\frac{1.95 \times 10^{-10}}{.3 \times .0012} = 5.4 \times 10^{-5}\ \%$$

on a mass basis or .975 x 10^{-4}% on a volume basis.

It is also worth noticing that a certain amount of fractionation of the gas coming up from the reservoir rock will take place due to variation in viscosity of the individual components. Consequently, permeation will enrich the hydrocarbon in light fractions.

In order that permeation may take place, the size of the pore openings in the overlying rock must be adequate, but it is not possible to fix a lower limit below which this phenomenon will not take place according to D'Arcy's Law. In all probability the lower limit depends on the size of the gas molecules and the pressure to which the gas is subjected.

2. Effusion

By definition, gas effusion takes place when two bodies of gas communicate through a small opening and when the pressure on the gas is such that the diameter of the opening is smaller than the mean free path of the gas molecules. When these conditions are fulfilled, the quantity of gas evolved through the opening is given by the following relation established in the kinetic theory of gases:

$$\eta = \frac{a t \Delta P}{\sqrt{2 \pi MRT}} \qquad (5)$$

where η is the number of mols effusing
ΔP is the differential pressure across the opening
a is the area of the opening
t is the time
M is the molecular weight of the gas
R is the universal gas constant
T is the absolute temperature.

Again a preferential separation between the molecules of the effusing gas occurs since the quantity of gas flowing is inversely proportional to the square root of the gas' molecular weight. Thus methane will effuse more rapidly than ethane, which, in turn, will have a rate of flow larger than propane. Recently, W. D. Urry[1] has proposed a quantitative expression for the rate of flow Q of gas through crystalline rocks:

$$Q = d^3 \frac{\sqrt{2\pi}}{61} \sqrt{\frac{RT}{M}} \Delta P \qquad (6)$$

in which:
l is the length of the capillaries
d is the average diameter of the capillaries which depends on the rock's crystalline structure, and the other quantities are as given above.

Formulae (5) and (6) hold only for the capillaries of the smallest size; they do not show any discrepancies, as might appear at first sight, as formula (5) is on a mol basis and formula (6) on a volume basis. The size of opening for which the formulae are valid can not be expressed as it depends on the size of the molecules but it appears to be of the order of 5 to 100 Angstrom units far too small to be seen with the most powerful miscroscope. (Note: One Angstrom unit equals 10^{-8} cm.)

3. Diffusion

Diffusion of gas through a solid is essentially chemical in nature and is a crystal lattice phenomenon; in other words, the gas molecules actually penetrate the molecular structure of the material in order to emerge at the other side of a separating solid partition. This phenomenon is perhaps a most important factor in explaining the presence of hydrocarbons in the soil as it gives the necessary explanation for the travel of gas through impervious strata such as massive limestone, shale beds, water bearing horizons, etc. Diffusion of gas through solids or liquids is governed by Fick's law which states that the rate at which a gas diffuses is proportional to the concentration gradient or to the pressure gradient. Consequently Fick's Law may be expressed on a concentration and a pressure basis as follows:

$$\frac{dm}{dt} = -a \frac{dp}{dx} \quad \text{(Pressure Basis)} \qquad (7)$$

$$\frac{dm}{dt} = -D \frac{dc}{dx} \quad \text{(Concentration Basis)} \qquad (8)$$

in which $\frac{dm}{dt}$ is the mass of gas in grams diffusing through one square centimeter per unit of time.
a is the diffusion coefficient on a pressure basis
D is the diffusion coefficient on a concentration basis.
$\frac{dp}{dx}$ is the pressure gradient
$\frac{dc}{dx}$ is the concentration gradient.

In either case, the diffusion coefficients (a and D) are a direct function of the square of the interatomic distances of the material through which gas is diffusing.

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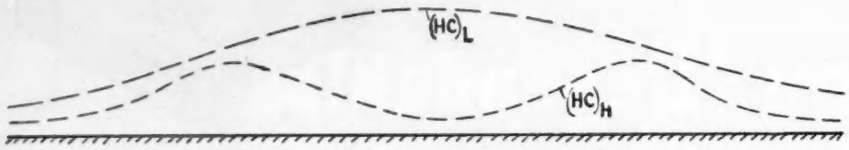

FIGURE 2

Distribution of light and heavy hydrocarbons in the soil above an oil field.

permeation. Consequently the conclusions which have been drawn concerning the shape of the curves of hydrocarbon concentration in the soil air due to permeation will also be valid in the case of diffusion. The two laws, D'Arcy's and Fick's, may thus be combined in a single one:

$$V = -\alpha \frac{dp}{dx} \qquad (9)$$

where V is the mass velocity of gas efflux due to both permeation and diffusion
α is the combined permeation-diffusion coefficient
$\frac{db}{dx}$ is the pressure gradient through the formations at any point along the path of efflux.

It is not known at this time how much the effusion phenomenon will disturb the law expressed by formula (9) but for the purpose of this paper it will be assumed that coefficient α of formula (9) will also represent the factor due to effusion.

It appears that coefficient α will be a function of the permeability of the overburden above an oil and/or gas field, the size of the openings, the molecular weight and viscosity of the gas, the crystalline structure of the grains in the formation, the interatomic distances, etc. In all, α appears to be a rather complicated function which, in view of the complexity of the formation, it will not be possible to evaluate. At most shall we be able to make an assumption as to its value. For a stratified overburden relatively undisturbed by tectonic phenomena, we may assume the constancy of α over relatively large areas. Where the beds are folded and faulted, this assumption may prove to be greatly in error. Again, as in other geophysical methods of prospecting for oil, the results of the gas survey will have to be turned over to a geologist who understands the principles of interpretation of the new method as well as the language of both geophysicist and geologist.

Field Procedures

There are two field procedures in use for the collection of underground gas samples; one method actually collects the air from the ground and the other secures a sample of the soil itself for the purpose of distillation in the laboratory and the collection of adsorbed hydrocarbon gases from the grains composing the soil. For both methods, the collection is made in bore holes ranging in depth from a few inches to some thirty feet and more. The test holes are distributed in profiles across the surveyed area or cover it in a geometrical network which will form the basis of later contouring of the results of sample analysis.

At this time very little is known about the various field and sample analysis procedures employed in carrying out the new geophysical prospecting method. The Russian investigators apparently are collecting soil gas in sealed bottles which are brought to the laboratory where the analyses are performed. However a simple portable field instrument is said to have been developed in Russia and the results of the two procedures have been found to agree within reasonable limits. An account of the American practice as carried out by one company in Texas has recently appeared in the literature[2], but nothing is known of the analytical procedure. It appears, however, that the heavy hydrocarbon compounds of the soil are alone sought for and that no differentiation between the individual members is desired. The results of the analyses are expressed apparently in parts per million by weight in a sample of soil.

In analyzing ground gas for traces of hydrocarbon, the Russian investigators attach most importance to the separation into two groups: the light hydrocarbon fraction and the heavy hydrocarbon fraction; these have special significance in the interpretation of the results of a soil gas survey as shall be seen later. The two fractions are separated by means of an adequate freezing mixture and the analysis yields two indices: the *heavy hydrocarbon number* $(HC)_H$ and the *light hydrocarbon number* $(HC)_L$. A third index may be obtained by burning the heavy hydrocarbons, thus the so-called *carbon number* (C) is obtained. This is a measure of the complexity of the heavy hydrocarbon molecules contained in the ground gas.

Interpretation of Data

The separation between light and heavy hydrocarbons is quite advantageous as it permits distinguishing between a gas field and an oil field. In Figure 2 are represented the general shapes of the concentration profiles on the basis of light and heavy hydrocarbon numbers for a fairly shallow oil field surmounted by a gas cap. It is assumed that the overburden is uniform in composition and that faults are completely absent. The light hydrocarbon number $(HC)_L$ presents a maximum right above the gas cap whereas the heavy hydrocarbon number $(HC)_H$ curve presents two maxima located above the edges of the field where the oil accumulation occurs. Should the field be a very deep one, these two maxima will form a broad high. Yet distinction between a gas field and oil field remains possible, as the gas field will not show any appreciable heavy hydrocarbon number.

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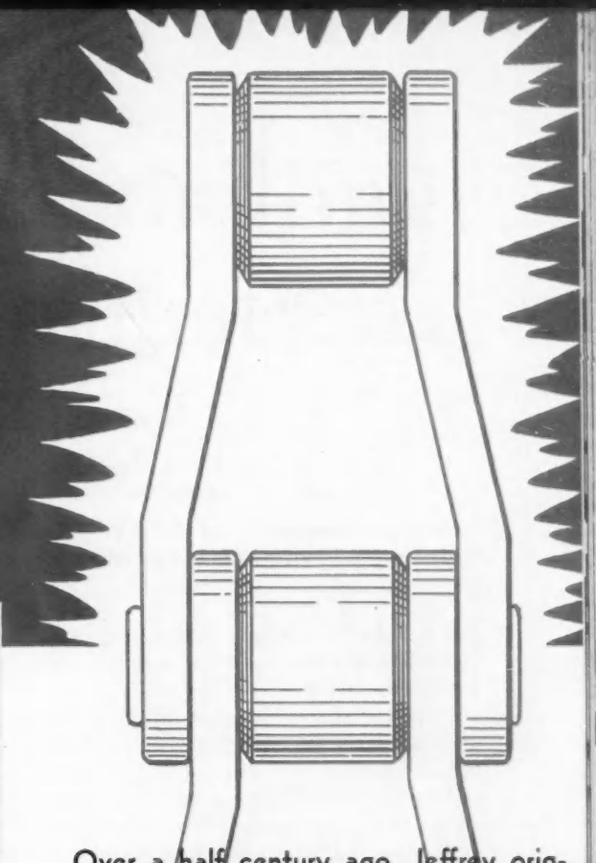

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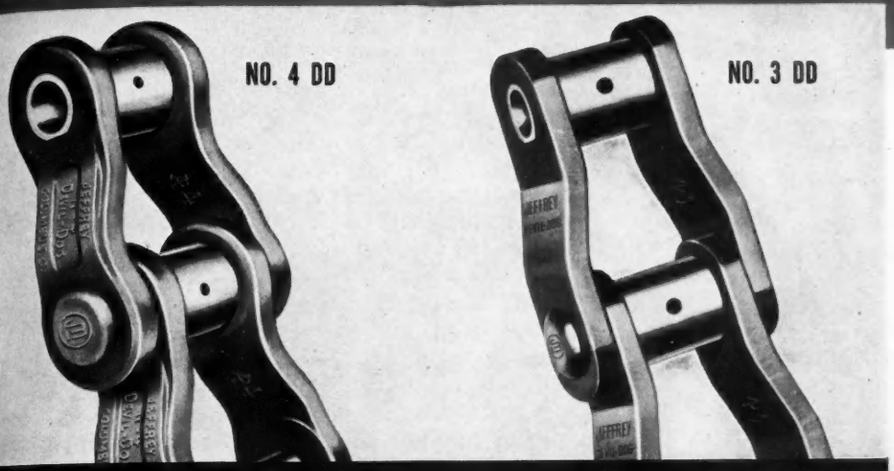

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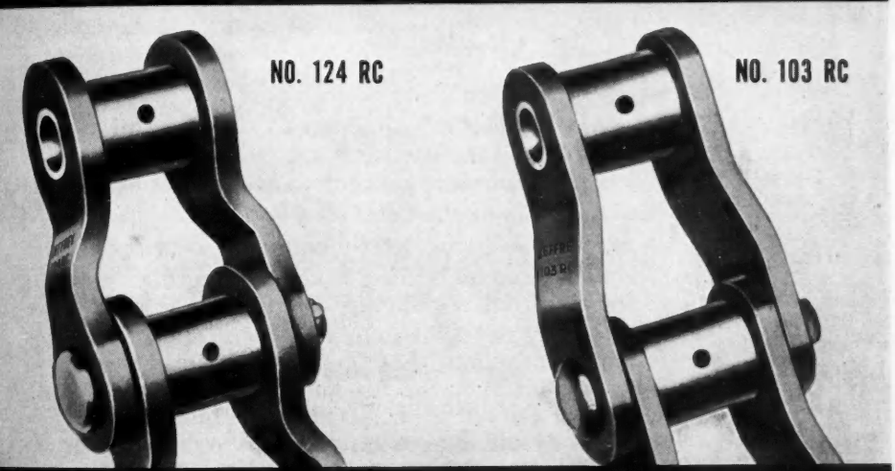

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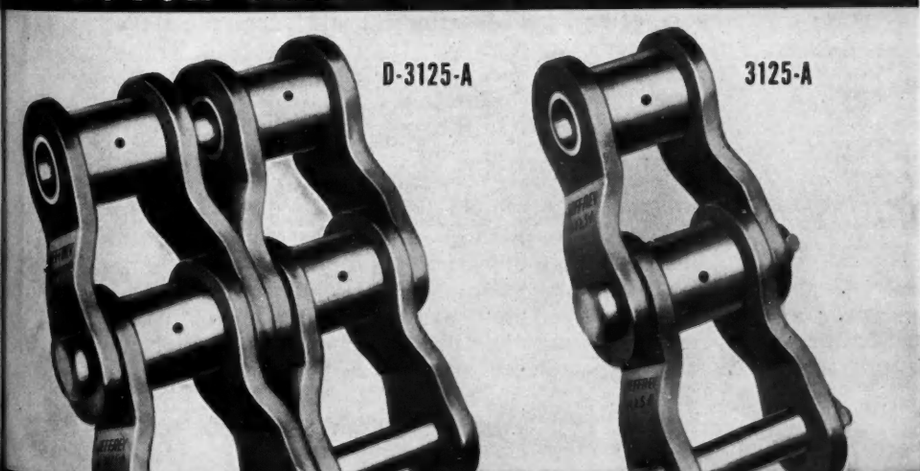

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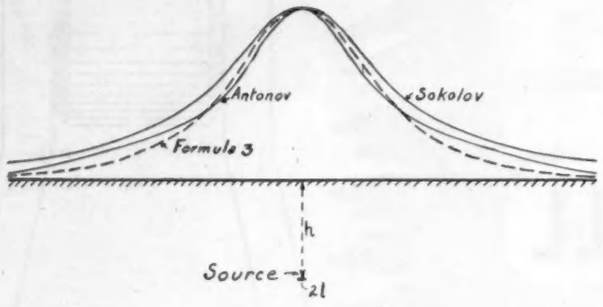

FIGURE 3

Graphical comparison of Antonov and Sokolov formulae for the interpretation of hydrocarbon gas surveys.

As a reference some published results taken at random are given in Table 2 from gas surveys carried on in Russia.

From Table 2 it appears that the presence of hydrocarbon gases in the soil begins to be significant when the hydrocarbon concentration in the soil air attains one part in a million or 10^{-4}%. Hence, in order to carry successfully a ground gas survey it is necessary to make the measurements with the above degree of precision and at the most it is necessary to be able to read one part in ten millions. However, the Russians have made their determinations on fields which are relatively shallow, of the order of 3000 feet in depth, and this is another reason why it is wise to provide an apparatus with the precision of 10^{-5}%.

Two methods of interpretation are propounded by the Russian scientists: one is due to Sokolov[3] and is based on the following formula—

$$Q = \frac{R}{h}\left(\tan^{-1}\frac{l-x}{h} + \tan^{-1}\frac{l-x}{h}\right) \qquad (10)$$

Q is the flux of gas through the surface of the ground per unit area and of time. The gas content in the ground air is proportional to this quantity.

R is a constant depending upon the properties of the geologic section, the gas pressure and its viscosity.

H is the depth of a source of gas infinite in length.

l is half the width of the linear source.

x is the distance of the test hole to the projection of the axis of the source on the surface of the ground.

Antonov[4] proposes a formula for the interpretation of the results of soil gas surveys which gives results essentially similar to Sokolov's method. Antonov[5], however, contends that Sokolov's formula is based on his own work and that the latter has made unjustified assumptions which have led to erroneous results in a series of cases. Antonov's[4] formula for an infinitely long source, horizontal in the ground and of width $2l$ is as follows:

$$C = A \times \tan^{-1}\frac{\sin h\left(\frac{\pi}{2}\cdot\frac{l}{h}\right)}{\cos h\left(\frac{\pi}{2}\cdot\frac{x}{h}\right)} \qquad (11)$$

in which is the concentration of hydrocarbon gas in the surface soil at a point of coordinate x from the axis of the oil deposit.

z is the depth at which the soil sample was taken.

A is a constant depending on the physical characteristics of the overburden and which is assumed to remain invariable over the prospected territory.

h is the depth of the oil and/or gas accumulation below the surface.

In order to compare Sokolov and Antonov's formulae the corresponding laws of hydrocarbon distribution have been plotted on Figure 3 which shows their degree of divergence. They are also compared to the law of hydrocarbon distribution as given by formula (3) which the author feels is rigorous. (Demonstration of this formula will appear in a subsequent paper.) Formula (3) has the advantage of being expressed as a function of measurable quantities.

In order to make use of formulae (3), (10) or (11) for interpretation of ground gas survey data, various values of l and h may be assumed and theoretical concentration profiles calculated until an assumed set of values for l and h fits the observed data.

The gas survey method offers also some possibilities as far as prediction of the probable gas pressure of the reservoir rock is concerned. Antonov[6] has established the following formula:

$$P N = K_{max} H^3 \qquad (12)$$

in which P is the field's pressure.

N is a coefficient which depends on the type of gas measured and on the character of the overburden.

K_{max} is the maximum concentration in the soil air.

H is the depth of the field.

Values of N must be determined in a given region and for a specified oil bearing zone. The depth H may be estimated from the survey and the shape of the gas concentration profiles.

Besides the hydrocarbon distribution in the soil as given by formula (3) for an infinite line source buried in the ground under permeable strata, definite relations between the accumulation of oil and gas and the soil hydrocarbon content have been established and have appeared recently in the literature. E. E. Rosaire[7] was the first to advocate the halo theory of soil gas distribution and a complete map of a survey carried on over the Hastings field, Texas[8], corroborates his theory according to which shallow mineralization or induration over a salt dome would be produced during the uplifting of the overlying sediments by the salt plug. This explanation is fairly plausible, and has been verified by other investigators[2] over the Pierce Junction salt dome.

However the method of geophysical prospecting under discussion may not be limited to salt domes and faulted structures. Russian investigators have definitely proved that small concentration of hydrocarbon gases exist in the soil air over low relief and unfaulted petroleum structures. Sokolov[3] gives the

TABLE 2

Heavy and Light Hydrocarbon Contents in Different Russian Fields

REGION	Heavy H. C. 10^{-5}%	Light H. C. 10^{-5}%	Remarks
Kala	800	180	Oil Bearing
Tshimbaevo	266	32	Oil Bearing
Surkhani	1300	....	Oil Bearing
Tchoguelek	89	45	Oil Bearing
Aian	10	10	Dry
Kalitzki Volcano	10	140	Gas at Shollaw Depth
Shalyqui	20	12	Dry

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TEXAS GULF REGION. Bit No. 1, hard-set and hard-faced with Haystellite, made 3,009 feet in 60 hours—50 feet per hour. No. 2 followed with 1,140 feet in 33 hours.

CONROE, TEXAS. A typical Haystellite-dressed bit went into the hole at 2,007 feet and drilled to 3,024 feet through the following formation:

From 2,007 to 2,080 feet—Shale and boulders
From 2,080 to 2,310 feet—Sticky shale
From 2,310 to 2,360 feet—Sandy shale
From 2,360 to 2,870 feet—Sticky shale
From 2,870 to 3,024 feet—Hard lime and shale

This 9⅞-inch diameter bit, after making 1,017 feet of hole, was less than 1/16 inch out of gauge.

EAST TEXAS. Three bits, dressed with Haystellite, made the following runs on three different wells:

9⅞-inch bit	. . .	2,439 feet
9⅞-inch bit	. . .	1,883 feet
11-inch bit	. . .	2,202 feet

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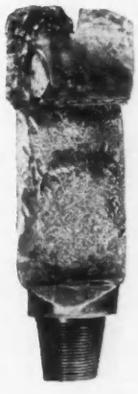

OILTON, TEXAS. This fishtail bit, hard-set and hard-faced with Haystellite, made 2,030 feet to complete a well, and was good for more. Wells are drilled here with one or two Haystellite-dressed bits, where four or five bits surfaced with other materials were formerly required.

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concentration distribution over such a field in Russia at Shubar-Kuduk.

In order to test the applicability of the method to prospecting for natural gas structures the author ran an analysis of ten samples of soil taken over the Woodhull gas field, New York. It is known that a certain percentage of ethane and heavier hydrocarbons is present in small quantities in the gas obtained from the Oriskany sandstone. Thus it was inferred that a technique similar to those appearing in the literature would give positive results. On account of the high adsorptive power of the colloidal matters of the soil for hydrocarbon gases it was thought that the analysis of actual soil samples would have the best chances of retaining ethane in measurable amount. The samples were collected on October 29, 1937, soon after the discovery of the field when the gas pressure was yet 1950 pounds per square inch and little drilling development had taken place. It was not, however, before the middle of the present year that a satisfactory method of analysis suitable for the differentiation between the various gases was developed. Results of the analyses appear in Figure 4. It shows two prominent highs, one at stations 4 and 5 and the other at stations 8 and 9. It is remarkable that these highs do not correspond with the limits of the field and that they are shifted to the south by about one half mile. It is known also that the fields of the gas belt in southern New York and northern Pennsylvania are limited by steep angle faults dipping north[9]. It is thus very likely that the two highs of Figure 4 indicate the outcrop of faults limiting the Woodhull field.

Conclusions

The foregoing discussion has pointed out the wide possibilities of ground gas surveys for determining many factors of importance. Foremost among these, of course, is its ability to determine if oil or gas is associated with a discovered structure.

References

[1] W. D. Urry—The Diffusion of Helium through Crystalline Substances and the Molecular Flow through Rock Masses, Jour. Am. Chem. Soc., Vol. 55, pp. 3242-3249, Aug. (1933).

[2] Mitchell Tucker—Soil Analysis Surveys Being Made as an Aid in Geophysical Studies, The Oil and Gas Journal, June 23, 1938, p. 20.

[3] V. A. Sokolov—Methods of Interpretation of Gas Survey, Neftianoe Khoziaistvo, Vol. 17, No. 5, pp. 18-23, (1936). (In Russian.)

[4] P. L. Antonov—Contribution to the Theory of Gas Survey, Neftianoe Khoziaistvo, Vol. 26, No. 5, pp. 19-23, (1934). (In Russian.)

Contouring Oil Fields by the Gas Survey, Neftianoe Khoziaistvo, Vol. 28, No. 10, pp. 33-35, (1935). (In Russian.)

[5] P. L. Antonov—On the Fundamental Equations of Gas Survey, Neftianoe Khoziaistvo, Vol. 18, No. 1, pp. 29-32, (1937). (In Russian.)

[6] P. L. Antonov—Estimation of Oil Field Pressures by Gas Survey, Neftianoe Khoziaistvo, Vol. 17, No. 8, pp. 29-31, (1936). (In Russian.)

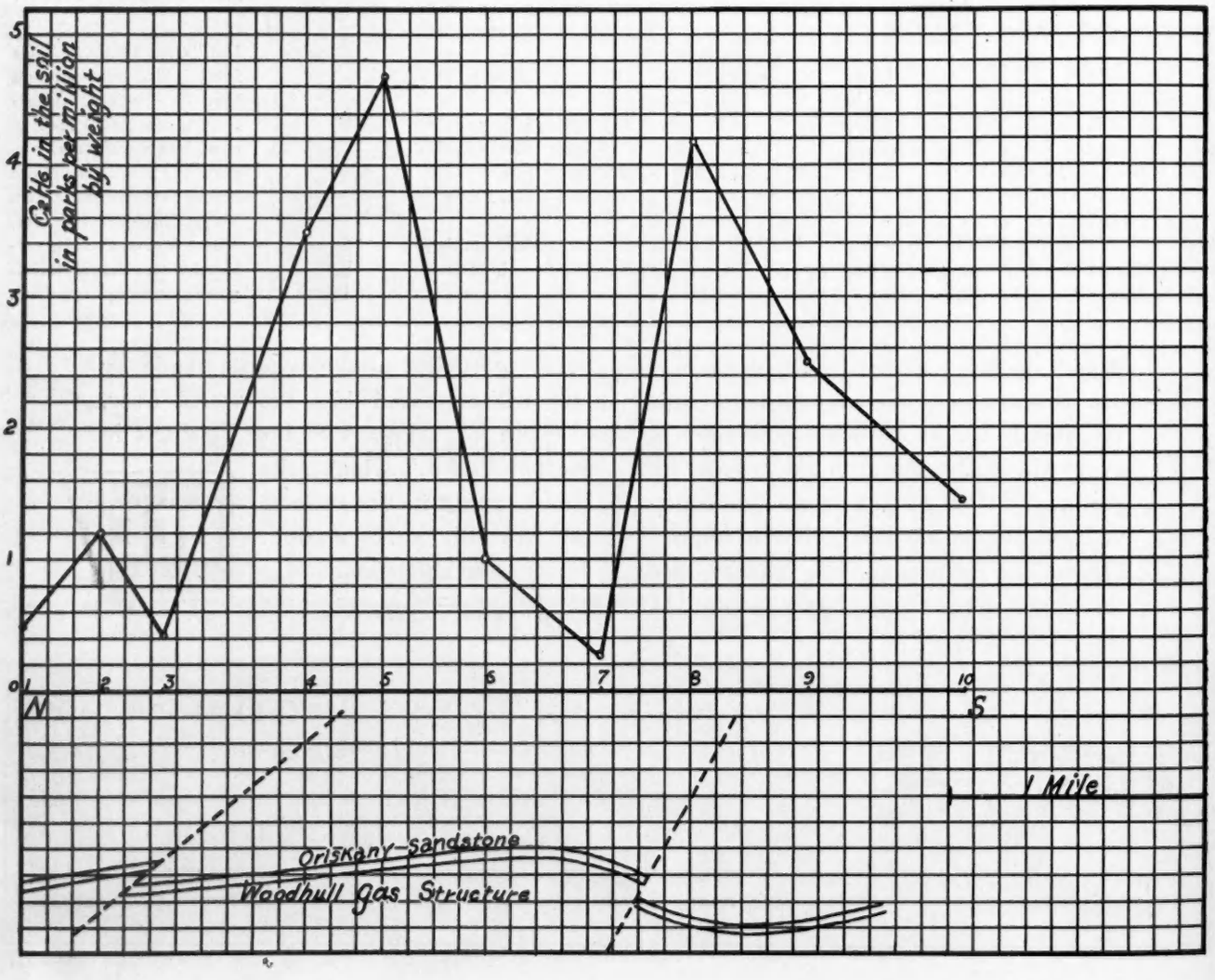
[7] E. E. Rosaire—Shallow Stratigraphic Variations over Gulf Coast Structures, Geophysics, March 1938, pp. 96-121.

[8] J. Brian Eby—Newer Trends and Methods in Geophysical Exploration, Midyear, Petroleum Engineer, 1938, pp. 31-40.

[9] J. French Robinson, et al—Subsurface Structural Geology of the Northern Pennsylvania and Southern New York Gas Fields, Proceedings of the Petroleum and Natural Gas Conference, 1932, pp. 9-18.

FIGURE 4

Soil ethane distribution over the Woodhull gas field of New York.



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To be delivered before the Petroleum Section at the Silver Jubilee Safety Congress and Exposition, Chicago, Illinois, October 10, 1938.

A Company Training Program as an Aid in Accident Prevention

By CAPTAIN A. A. NICHOSON,
Manager, Personnel Department, The Texas Company

Some Major American Problems

I AM often inclined to believe that complacency is an American characteristic, especially at times when the current of life flows smoothly. The past few years, however, seem to indicate that certain local and foreign disturbances have definitely made themselves felt in the behaviorism of the American public. Inasmuch as the broad term "Safety" embraces the great American public, to me it becomes obvious that disturbances should have been felt and recorded in this field the same as in other fields of American life. We are living in a world that is badly distorted, where the blossoms of ideas have failed to grow into the fruit of ideals, where hopes have been completely destroyed, and the highways and by-paths of life are strewn with countless outworn and discarded agencies. Safety as a fundamental, however, has survived and yet it has been definitely subjected to these turbulent times which have been no respecter of tradition or soundness. In the restoration of a practical mental equilibrium in American life, and because of its important bearing upon all angles thereof, it seems to me that a complete understanding and a wholesome application of the safety philosophy is America's number one problem. Because of twenty-five years of organized experience on the part of industry in attacking this problem it becomes apparent, by virtue of the important role which safety has played in the drama of American life, that it is highly impracticable to believe that, individually or collectively, we can attempt to avoid or evade the issue.

The theme of this new understanding obviously must come from this empire of workers who have, through managerial patience, been taught safety-consciousness to accompany their professional or vocational activities. Conforming with the tremendous importance of human life to the American program as set up in competition with other civilized nations of the world, a safety program is not the matter of choice that it might have been two decades ago. Rather, it becomes a national necessity, and

A SAFETY PROGRAM CAN NO LONGER BE A MATTER OF CHOICE IT BECOMES A NECESSITY

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DRILLED BELOW 10,000 FT

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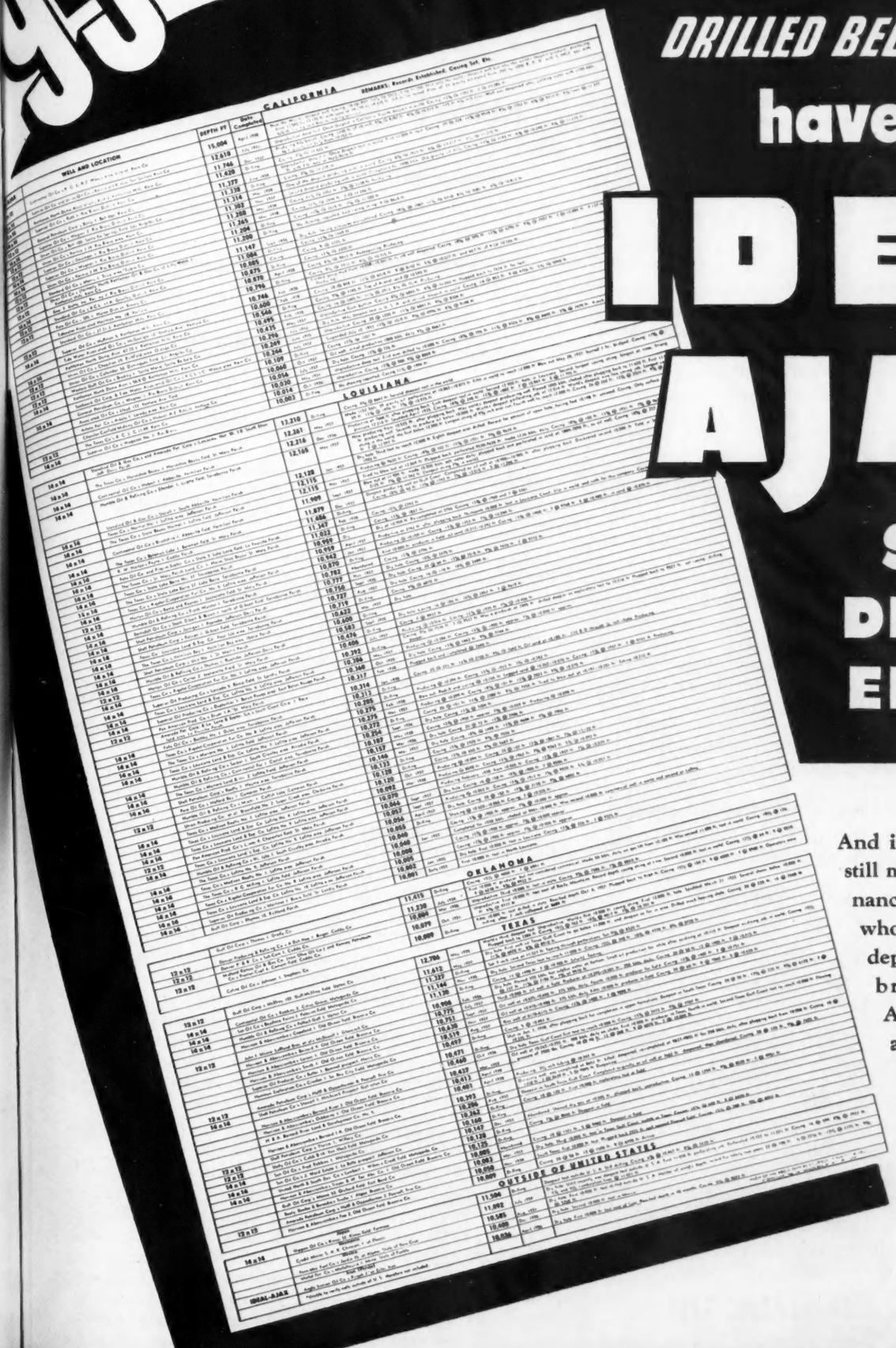

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Safety Cooperation

The factual and statistical background of safety in America seems to point to the fact that there is an urgent need for closer cooperation among the numerous units and agencies which have recognized the humanitarian and economic importance of this issue. For many years industry walked alone in the matter of safety, and to the countless millions engaged in the industrial empire it must be a tremendous satisfaction to know that their leaders, prompted by humanitarian instincts, pioneered in what today has become the greatest and most important movement in the world. The time has arrived, however, when we must thoroughly understand that industry is only a part—though a vital and integral part—of public life, and that the things that affect industry affect the public and vice versa. Men today spend but a small portion of their lives within the industrial domain and there can be no divorcement of Americanism or citizenship within and without the plant.

Therefore we begin to recognize that safety is something that must accompany us uninterruptedly around the face of the clock, 24 hours a day, and that it incorporates the families of workers engaged in industry, friends and neighbors who become a part and parcel of the public, and most assuredly the teeming activity on America's millions of miles of superhighways. It may be necessary to go further in legislative channels and define their influences upon certain elements which may have a direct bearing on an accident record, but in the final analysis the practical, common-sense and human answer to the safety problem will be found in the fact that men of industry become unselfish ambassadors of better living who carry the philosophy of safety, which has been so aptly and ably projected through industry into their personal and public lives.

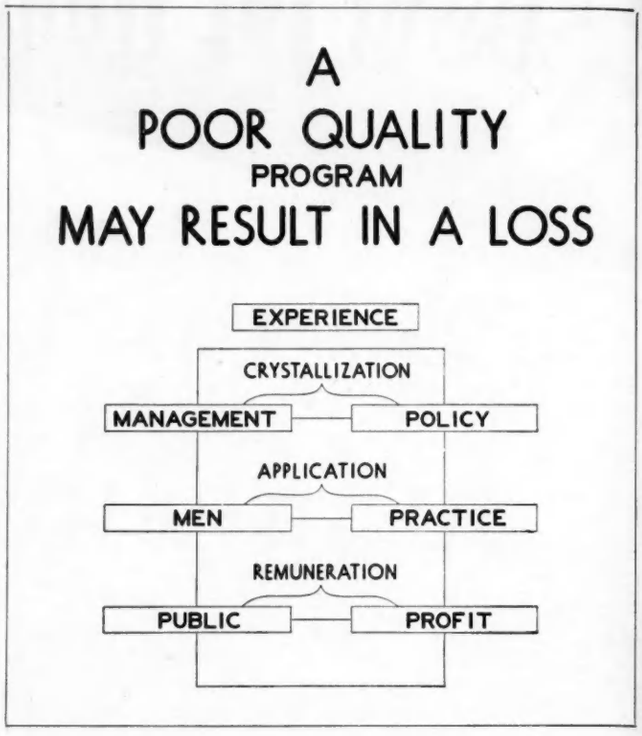
The Three Essentials of a Safety Program

I reiterate that the most prolific source of informative material upon which to build this needed cooperation in broad accident prevention is to be found in the quarter of a century of recorded and analyzed experience of industry. Environment and conditions obviously change, but the fundamentals of this experience are as applicable to the home life and to the highway as they are to the shop and factory, and this will be as true a thousand years hence as it is today. This experience can be organized and classified into three general component parts:

First is the matter of crystallization, which becomes a responsibility of management and involves the establishing of a sound and practical policy with possibilities favorable to a two-way business flow.

Secondly, the most important is the matter of application which evolves as a vocational responsibility within the gates of industry and is a moral responsibility on the outside. This, however, is a matter of practice and must be represented by performance rather than by mere lip-service. To believe is one thing and to perform is another. And although I do not desire to deviate from the subject I am motivated to call attention to the dire necessity for a type of leadership which will stimulate in the minds of men a self-moved desire to practice safety. We have had too much compulsion forcing compliance through the fear of consequences of and penalties for nonconformity.

Thirdly, we find the reflection of that age-old law of compensation which is remuneration coming chiefly from the group I call the public and which obviously includes the workers of industry, but which also incorporates those other human beings who, collectively, make up our communities. From the public accrues the profit to a well-organized, closely knit cooperative program, and let us not forget that profit is not entirely of a monetary nature but rather incorporates a general understanding which generates good will towards organizations whose smokestacks may fringe the edge of any community. In this lies one of industry's greatest hopes, and American industry should take definite cognizance of the exam-



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A MOTOR DRIVEN

REED

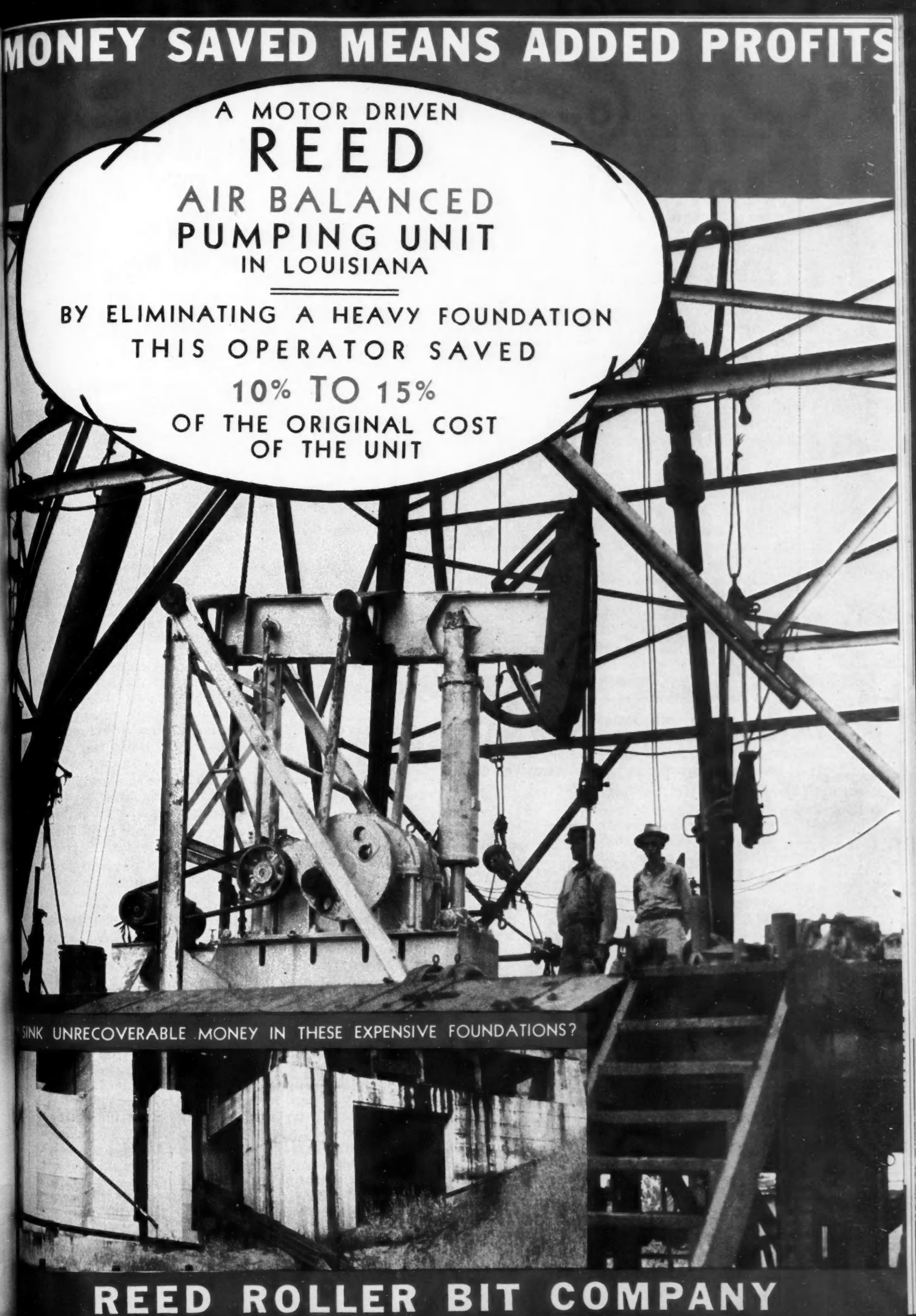
AIR BALANCED PUMPING UNIT

IN LOUISIANA

BY ELIMINATING A HEAVY FOUNDATION
THIS OPERATOR SAVED

10% TO 15%

OF THE ORIGINAL COST
OF THE UNIT



SINK UNRECOVERABLE MONEY IN THESE EXPENSIVE FOUNDATIONS?

REED ROLLER BIT COMPANY

ples which have been set by certain foreign powers where bankruptcies of government have resulted only because of a falling off of their customers.

The Managerial Analysis

To contemplate a safety program because it may be a matter of following suit with neighboring industries is a fallacy; to harbor one purely from an economic angle is unsound; to foster one because of compelling influences is fatal. Management must initially break down the component principles involved in a safety program with analytical scrutiny before it can expect to determine the type which will best serve the needs of its organization and its problems as well as to justify its inauguration. I am not going into the details of this analysis which may be either simple or elaborate, depending upon many contingent factors, but the four elements of this analysis I think should include:

First: What are the objectives, and what are the reasons for plotting and charting a safety program?

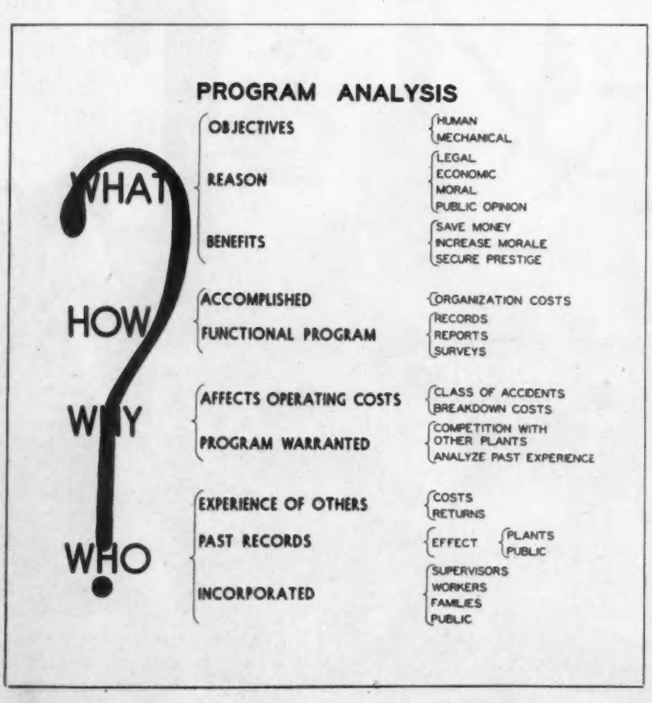
Second: How can this be accomplished; how can it function most effectively; and how can a program be established?

Third: How will such a program affect operating costs, public good will, sales volume; and why is such a program warranted even if occupations are considered non-hazardous, or performance records may be exceptionally good, and

Fourth: Who has experienced an inauguration of such a program; who possesses past records; who will become incorporated in this program; and who is responsible and liable for its effective promulgation?

The Basic Elements of a Safety Program

Because of the complicated and colorful fabric called social civilization today, most of the human element that contributes to its healthy maintenance is at least semi-parasitic in performance. The higher we elevate our social plane the more dependent and



ELEMENTS OF THE PROGRAM

1. CLASSIFY OCCUPATION AND ATTENDING HAZARDS
2. PHYSICAL SURVEY OF OPERATIONS TOGETHER WITH MECHANIZED PREVENTION
3. ESTABLISH DEFINITE RESPONSIBILITY OF PROGRAM CONTROL
4. INSTITUTE SYSTEM OF CHECKS AND BALANCES

interdependent we become, and it requires a recognition of this fundamental to stimulate a conscious awakening of our sense of moral responsibility toward other people concerned in the affairs of mankind. A complete program capable of exerting its influence beneficially in a broad safety movement must, in the final analysis, rest upon those people charged with the actual performance of industrial pursuit, but such a plan must be two-fold and, as has been our experience in the clarification of many misunderstandings, the necessity for an understanding partnership between those who guide and those who follow becomes essential.

Therefore it seems to me that there are four preeminent essentials that must be given careful consideration in the building of a complete program:

First: To clarify practically, simply, and completely, the occupations and their attendant hazards.

Second: To make and to maintain a physical survey of industrial operations together with the mechanized media for preventing mishaps.

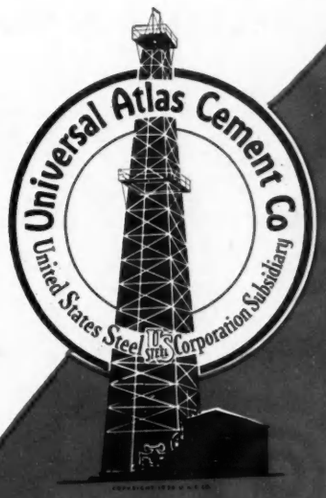
Third: To establish by education and persuasion a definite responsibility for the control of the program.

Fourth: To institute a very simple system of checks and balances in order that men and management involved in the movement may consistently be brought closer together on a common ground.

The Employe

I reiterate that the success or failure of the operation of a plan finally devolves upon the individual employe. Only in rare instances will it be possible for him to subsist very long without reasonable safety guidance, council and supervision. This is no reflection upon the average man who performs his work well and who handles his personal affairs with acumen and efficiency, but when problems are multiplied by hundreds of thousands, the average man's brain lacks the ability to grasp the true significance

UNAFLO



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Unaflo back washed out with normal pressure after 2 hour shut down

In this particular well, a cement retainer was run to 4063′ on 2¼″ tubing, above the top perforations which had been previously cemented off.

598 sacks of Unaflo cement were pumped into the tubing. Working pressure was only 1000 to 1500 lbs. At this point there was an unavoidable delay of 2 hr., 14 min. However in spite of this shut down, Unaflo was back washed out of the tubing with normal pressure.

Time of cementing operations:

Mix and pump 598 sacks Unaflo	1 hr. 23 min.
Make repairs	2 hr. 14 min.
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Total	4 hr. 22 min.

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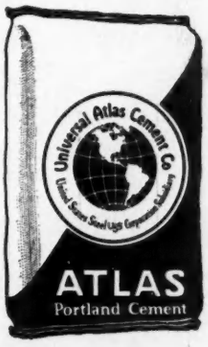

Atlas portland cement for *surface* work and for cementing *surface* casing. Unaflo cement is recommended for *deep* well work.

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U-19

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CEMENTS

of the picture as a whole, or to dovetail the various component parts as they belong. You can never say that one hundred average brains will make one good brain, but industry calls for the good brains which, through our open competitive scheme of affairs, are finally discovered, classified, and developed; and, although the responsibility of direction devolves upon this good brain, the responsibility of performance will depend to a large extent upon the average brain.

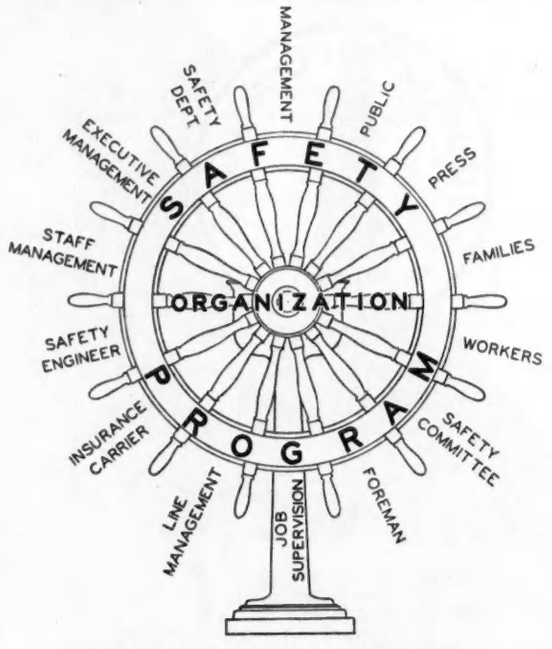
The program must be simple, easily understood and retained, and readily applied. It must include the employe from the time of his initial employment through job assignments, transfers, rehabilitations, etc., and remain with him until the time may arrive when he shall have proven that his brain is capable of serving others better, and when he finds himself to be promoted labor (which we call management) charged with the grave responsibility of guidance and helpfulness.

Leadership — Control

It matters little the methods that may be pursued in the promulgation of a plan unless the principles incorporated are sound and basic. Once these principles have been accepted and promulgated by management through channels which have been deepened and cleared so as to eliminate all possible distortion and discoloration, the crux of the situation depends to a large extent upon the calibre of leadership, and the influence of this leadership will obviously make itself felt far beyond the geographic limitations of any industrial plant. On a piece of land where 130,000,000 people are endeavoring to eke out a livelihood, even the matter of their every-day relationships is so far-reaching and complicated as to go beyond the concept of the human mind. Let us not forget that safety is a part of human relationships, and the need, therefore, is to develop minds which can see things clearly and can believe—minds which can turn dreams into realities—and minds which can think clearly for other people and tell them exactly what to do. This to me is the heart of the thing that we call leadership and becomes highly important in our present-day scheme of affairs, and pre-eminently essential in the solving of those common problems of tremendous magnitude of which Safety heads the list. If the leadership of industrial America in its plant Safety programs, irrespective of the size or the nature of the plant, can inculcate into the minds of the men involved therein a sound and unshakeable faith in the philosophy of safety—that it was primarily designed for the worker to continue to live and finally enjoy the fruits of his labor—and if that leadership possesses the strength of character that is able to inject itself into the private lives of these workers without any infringement upon their personal prerogatives, and if it can leave its stamp of integrity and ability upon the community life in which it lives, then we shall be able better to apply the education and the engineering of human travel on the Road of Life, and to relinquish some of the costly enforcement that in the past has been too lax in persuading people to accept their share of public responsibility in the matter of living.

May the men who are privileged to live their lives in this great industrial empire understand that, in the final analysis, this tremendous and colossal superstructure of opportunity which has been reared at a terrific cost and sacrifice, may crumble unless we recognize that its preservation depends, to a large extent, from within and without, upon a consistent and persistent and day-by-day application of this streamlined version of the ancient law of self-preservation.

COMPLETE TRAINING PROGRAM SPELLS COMPLETE CONTROL



THE PILOT WHEEL OF SAFETY

THE PROGRAM MUST AFFECT THE EMPLOYE

1. INITIAL EMPLOYMENT
2. JOB ASSIGNMENT
3. TRANSFERS
4. REHABILITATION
5. PROMOTION

Spliced Spinning Line Saves Derrick Time

By M. T. PATE

THE use of two separate lines when making up drill stem, when handling strings of pipe a mile or more in length, involves a needless loss of time while the entire crew stands by as one man removes the spinning line from the cathead and picks up and runs on in its place the line for setting the joint tight by means of the buck-up tongs.

On the Morgan 6-A and other wells being drilled to the 7700-foot sand in the Schuler, Arkansas, field, the use of the forked or spliced catline shows the smooth perfection of a double play or forward pass. Using the normal length of spinning line as a basis, there is spliced into it a shorter length of rope of the same size and stranding, long enough to permit the customary knotting to the eye in the end of the tongs.

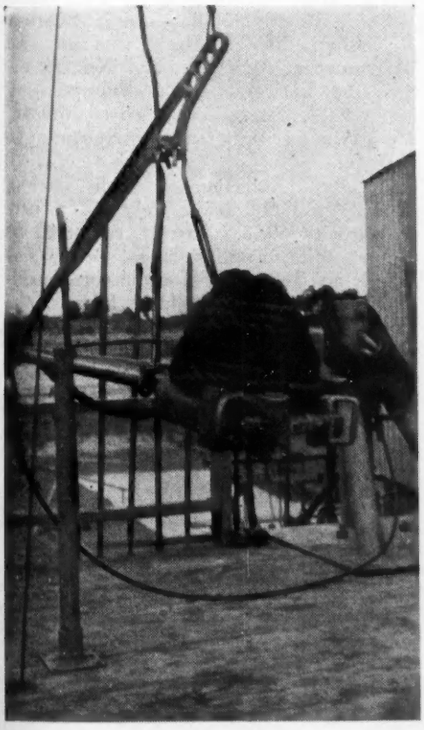
While spinning up the drill stem, the end attached to the tongs hangs free on the derrick floor, on the side away from the workmen, and clear of the rotary table. As the last turn of the spinning line is whisked from around the drill stem the motion of the splice toward the cathead takes up the last of the slack in the buck-up line, and almost as one continued motion the last jerk of the spin becomes the setting motion of the tongs.

Since the two points of greatest rope wear are on the cathead at one end and where the coiled end is contracted to grip the wet drill stem, the splice is made into this line, leaving the tong end free for resplicing into the new spinning lines as often as that portion requires replacement.

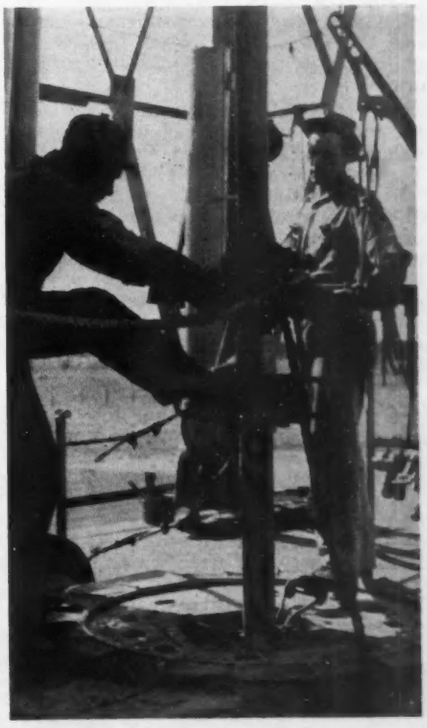
Using the spliced line permits the man at the cathead to throw the necessary turns there while the next section of drill stem is being readied. Throughout the job there is no loose line on the floor to add a hazard to the men working there, nor to cause frequent loss of time through inadvertent placing of the wrong one on the cathead.

An ordinary three-pass short splice is sufficient for the junction in the spinning line, it being so placed as to afford ample coils for the actual spinning operation, yet measured to fall short of actual contact with the cathead when the buck-up line is pulled taut at its farthest arc of swing.

Even with the doubled work imposed on the cathead end of the line when thus serving as anchor or purchase for both spinning and buck-up operations, the wear at that point, being distributed over twice the length normally covered when using two lines, just about equals the abrasion and fraying at the drill stem. There is thus a noticeable saving in line required for a given footage, due to the shortened amount required for the tongs.



The splice rides close to the tongs as the spin begins, while the buck-up end lies clear of rotary table and men, as shown to the right.



Between jobs the line, still fastened to the tongs, is coiled thereon, ready for use clear of drilling activity, as shown to the left.

WORLD DEVELOPMENT and TECHNOLOGY

Edited by
WM. V. GROSS, Associate Editor

Canadian Fields

All Turner Valley wells held to less than 1000 barrels allowable each . . . Henry will attempt to develop Twin River and Del Bonita structures

ALLOWABLES of the 56 crude wells in the Turner Valley field of Alberta, Canada, were reduced 6000 barrels daily last week, or about 21.4 percent, by the Alberta Petroleum & Natural Gas Conservation Board to conform with a declining demand for oil. A drop in tourist traffic in West Canadian provinces and the end of the harvest are factors attributed to the lower demand.

In view of the reduction in allowables, which is holding all Turner Valley wells to less than 1000 barrels daily, there is considerable dissatisfaction on the part of Calgary operators over continued imports from Montana. Imports during August, according to the Alberta Producers Association, reached 27,308 barrels at Coutts. Of this total, 831,423 gallons was gasoline and naphtha, 23,583 gallons Diesel fuel, 80,191 gallons distillate and 20,600 gallons crude oil.

Alberta's oil production for the first six months of this year was officially valued at $3,712,838 last week by Hon. E. C. Manning, provincial minister of trade and industry. This compares with $1,894,575 for the corresponding period of last year, or a gain of almost 100 percent. Production totaled 2,829,370 barrels for the first half of this year, compared with 970,563 barrels in the same period a year ago, a gain of almost 200 percent.

Two Structures Busy

A development program for Southern Alberta, to take place on both the Del Bonita and Twin River structures, has been announced by Frank R. Henry, secretary of Terminal Oil Company, Limited. The company's No. 1 on the Del Bonita structure was having a liner cemented, after which the casing will be perforated at the oil zone between 5056 and 5136 feet and treatment given with 5000 gallons of acid. The company's No. 2 in the northwest quarter of Section 7, Township 1, 21-w4, has been spudded and was standing at 175 feet. A deep test to the Devonian limestone is planned for the Twin River structure.

On Moose Dome, west of Bragg Creek, Alberta, Moose Oils, Limited's No. 2, Legal Subdivision 8, Section 29, Township 22, 6-w5, is to be deepened into Devonian limestone from 1550 feet. The well has been producing about 25 barrels of crude daily for several months by means of a swab connected to a walking beam. The steam engine is being operated by the heavy gas flow from the company's No. 1. Oil was being cleared from the No. 2 last week to permit resumption of drilling operations. The Moose structure has the geological formations penetrated in Turner Valley exposed, making it one of the most interesting in the province from a geological standpoint.

Ram River Wildcat

With the road completed to within 200 yards of the location, work on the derrick for the first test of the Ram River structure west of Rocky Mountain House was started last week by Ram River Oils, Limited. The test will start in the top of the Devonian series and close to the contact of the Banff shales with the Devonian limestone. The location was selected by Russell V. Johnson, geologist, and is about 100 yards west of the crest of the anticline. It is hoped that production may be obtained within 3000 feet.

On the Highwood-Sinclair structure, Green Valley Petroleums, Limited's Banner 1, wildcat on Legal Subdivision 6, Section 34, Township 17, 3-w5, resumed drilling last week and was in a hard brown limestone formation changing toward dark green. Slow progress was being made, with total depth of 6247 feet, or 886 feet in the Madison limestone. Encouraging oil shows higher in the limestone give weight to expectations that the test may open a new field.

In the Turner Valley field, Brown Oil Corporation, Limited's 5, Legal Subdivision 12, Section 16, Township 18, 2-w5, encountered the top of the Madison lime at 6657 feet. Casing was cemented in the formation and drilling resumed. Bottom at last report was 6743 feet.

Royalite Oil Company, Limited's 37, on Legal Subdivision 11, Section 5, Township 19, 2-w5, will be the next new start in Turner Valley. It had derrick erected, boilers 80 percent installed and was moving in machinery at last report. The company's No. 34, Legal Subdivision 7, Section 5, Township 19, 2-w5, had a curious cardium repeat and was drilling at 5495 feet; No. 35, Legal Subdivision 7, Section 27, Township 20, 3-w5, was in the Blairmore at 3179 feet, and No. 36, on the line between Legal Subdivisions 13 and 14, Section 32, Township 18, 2-w5, was drilling in the Bentons at 1857 feet.

Canadian production of crude oil and natural gasoline during July hit a new record with 693,332 barrels, compared to the preceding month's output of 637,654 barrels and production for the corresponding 1937 month of 244,931 barrels, the Dominion Bureau of Statistics at Ottawa reported last week. Production for the first seven months of this year totaled 3,612,757 barrels, compared with 1,307,544 barrels for the corresponding period a year ago.

Of the country's total production during July, Alberta furnished 678,243 barrels, of which 673,810 barrels was from the Turner Valley field.

Imports of crude petroleum totaled 142,585,074 imperial gallons during July, while the value of petroleum, asphalt and their products imported during the month was set at $6,955,014, an increase of 4 percent over the June import valuation.

Steps to increase use of refined products

OIL IN PHILIPPINES

Oil in commercial quantities has been discovered on the Bondoc Peninsula, Tabayas Province, Philippine, according to an official statement by Far East Development Company. The discovery well produced at the rate of 200 barrels daily from a depth of 568 feet, and the company is planning an intensive development program for 1939.

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from Alberta crude on public works projects and by the general public were taken last week by the Alberta Petroleum Association in an effort to check the seasonal decline in the crude market demand. A statement was issued calling attention to a "buy home products" campaign successfully conducted by Montana producers, at one time serious competitors of Turner Valley operators for the crude oil market of the Canadian prairie provinces.

"In line with the example set during the past year by the oil industry in the State of Montana, the Alberta Petroleum Association believes that the time has arrived to make Albertans conscious of their citizenship duties in regard to the purchase of Alberta refined products," the statement read. "The success achieved in Montana because Montana motorists got right behind their own oil industry should be duplicated here in Alberta.

"After months of patience, operators, refiners, distributors, and the hundreds of wage earners supported directly or indirectly by the Alberta oil industry are now appealing to the general public to whole-heartedly demand Alberta refined gasolines, and to emphatically refuse that which is being imported from foreign fields.

"An appeal has been made to the federal and provincial governments to insert a clause in all future public works contracts where power is used calling for the use of gasoline refined from Alberta crudes. Alberta taxpayers have built and maintained the streets, roads and highways of this province from the use of which many companies and individuals derive their livelihood and income. These companies and individuals should ask themselves if it is right that these same streets, roads and highways should be cut up in all kinds of weather by cargoes brought in to compete with products produced right here in Alberta, especially when Alberta already has far more than its immediate needs.

"Montana motorists soon put a stop to the importation of petroleum when they realized that the imported products were retarding the development of their own state. The appeal to support home industry met with tremendous response. The Alberta Petroleum Association is making a similar appeal to Alberta motorists today, an appeal by Albertans to Albertans, to help build Alberta. This appeal is based on sound, common sense, and the fact that there is no better crude produced anywhere than that which is produced right here in Alberta, and from it a quality of gasoline is made that compares in every way to that brought in from foreign oil fields."

Announcement of a second wildcat test of the Hunter Valley structure of Alberta was made by Campbell M. Hunter, O. B. E., president of Hunter Valley Oil Company, Limited, contingent upon financing arrangements now under way in England. The company's No. 1, drilled to 8274 feet last year before being abandoned because of mechanical difficulties, logged similarly to Turner Valley wells. The first well, Hunter said, provided valuable data on the structure which would be profitable in making a second test.

Heavy grease was oozing from fissures in the deep lime at Green Valley Petroleums, Limited's Banner 1, Legal Subdivision 6, Section 34, Township 17, 3-w5, wildcat test of the Highwood-Sinclair structure. The oil, which first appeared like axle grease mixed with mud on the tools, was showing cleaner with additional drilling and was accompanied by some gas. Bottom was at 6275 feet, about 915 feet in the Madison limestone.

Ram River Oils, Limited, was preparing to spud its No. 1 this week as the first test of the Ram River structure west of Rocky Mountain House, Alberta. Road was completed to location last week. The test will start in the top of the Devonian series and close to the contact of the Banff shales with the Devonian limestone. The location was selected by Russell V. Johnson, geologist, and is about 100 yards west of the crest of the anticline. It is believed that production may be obtained within 3000 feet.

Terminal Oil Company, Limited, has announced a development program for Southern Alberta, to take place on both the Bonita and Twin River structures. The company's No. 1 is having a liner cemented after which the casing will be perforated at the oil zone between 5056 and 5136 feet and treatment given with 5000 gallons of acid. The company's No. 2, in the northwest quarter of Section 7, Township 1, 21-w4, has been spudded and was standing at 175 feet. A deep test of the Devonian limestone is planned for the Twin River structure.

Moose Oils, Limited's No. 2, Legal Subdivision 8, Section 29, Township 22, 6-w5, on the Moose Dome structure, west of Bragg Creek, Alberta, is being deepened into the Devonian limestone from its present depth of 1550 feet. Devonian Petroleums, Limited, is providing financing for the additional drilling. The test has been producing about 25 barrels of crude daily from its present depth for several months with a swab connected to a walking beam. The steam engine is being operated by the heavy gas flow from the Moose company's No. 1. Geological formations penetrated in Turner Valley are exposed on the Moose structure, giving it additional interest from a geological standpoint.

Mexican oil decision delayed by judge

Oil companies were accused of seeking sinister diplomatic intervention by Justice Jose Maria Truchello during the debate which resulted in the federal supreme court deferring until October 8 its decision on the firms' appeal from expropriation.

Two representatives of the Italian government are in Mexico City negotiating for a large supply of oil and by-products with the government on the basis of the building of three large tankers in Italy and the rest of the payment in cash.

Oil and by products exports from Mexico April 1 to July 31 are announced as follows by Petroleos Mexicanos, the official oil company: April: 35,076 barrels, worth $48,716 (American); May: 615,615 and $497,600; June: 723,172, $731,530, and July: 733,774, $727,588.

Destination of these shipments was not announced. Germany, according to unofficial reports, took about 2,500,000 barrels of all Mexican oil and products from March 19, the day after expropriation, until August 31. During the companies' regime, oil and products exports amounted to about 2,000,000 barrels a month.

Congress has approved payment of a government pension of 10,000 pesos ($2000) at the rate of ten pesos daily to the widow of Capt. Renato Gonzales de los Santos, army aviator, who was killed in the crash of his plane while aiding distribution of pamphlets setting forth the government's reasons for expropriating the oil companies.

Claims for 134,000 pesos ($26,800) wages in connection with the general strike of last year have been filed by the oil workers with the federal board of conciliation against the Mexican Eagle, Huasteca, Sinclair Pierce, California Standard of Mexico, and Consolidated Oil of Mexico.

Another large Mexican oil and by-product consignment is headed for Japan, the Nippon tanker Tohomaru having loaded 75,000 barrels at Coatzacoalcos, Vera Cruz Gulf port, recently. The tanker is being guarded by two Japanese destroyers that are hovering offshore. The consignment is for a Yokahama company.

Japan's deepest test gets 11,550-foot production

After having encountered considerable difficulties in Nippon Oil Company's deep test at Taiwan (Formosa), the well was finally completed, August 5, at a depth of 11,550 feet. According to K. Uyeno, general manager of production, the well is yielding about 20 barrels of 40 gravity crude per day and produces approximately 1 million cubic feet of gas through 5/8-inch choke.

Encouraged by the successful completion of this test, the company assumes the presence of prolific oil sands below a high pressure gas sand, and is expected to drill another deep test.

Peruvian crude recovery running below last year

Production of crude oil in Peru during July amounted to 1,337,430 barrels, bringing the cumulative total for the year up to 9,224,450 barrels, a decrease of 855,392 barrels from the 10,079,842 barrels produced the first seven months of 1937. These figures, furnished by Julian Greenup of Lima, represent production of the two leading companies operating in Peru, International Petroleum Company, Limited, and Compania Petrolera Lobitos. Other crude production in that country is negligible.

Of the above totals, International produced 7,642,562 barrels during the first seven months of the year and Lobitos produced 1,581,888 barrels. January was the peak month for both operators and February the low month.

Peru's production by months as represented by recovery of the two companies for the first seven months of this year and last is shown in barrels in the following table.

	1937	1938
January	1,466,151	1,367,101
February ...	1,336,179	1,225,995
March	1,481,166	1,346,306
April	1,428,197	1,297,553
May	1,452,739	1,344,980
June	1,429,389	1,305,085
July	1,486,029	1,337,430
Totals	10,079,842	9,224,450

MEN IN THE INDUSTRY'S NEWS

EARL V. HEWITT NAMED GENERAL PRODUCTION SUPERINTENDENT OF PAN AMERICAN PRODUCING COMPANY

FIRM ALSO ADVANCES H. R. FUNK AND O. H. EICHELBERGER

EARL V. HEWITT, has been appointed general superintendent of production for Pan American Production Company, Houston, effective October 1. He succeeds C. A. Russell, who recently resigned from the company to go in business for himself. Hewitt became associated with Pan American Production Company on November 12, 1935, and completed the concern's first well in the Gulf Coast at Port Barre, St. Landry Parish, South Louisiana. Hewitt obtained his high school education in Detroit, Michigan, and later attended the University of Michigan, where he studied chemical engineering. From November, 1921 to July, 1929 he was connected with the Michigan Petroleum Corporation in the Haynesville field. Following this connection he went with Shell Petroleum Corporation in July, 1929, as division mechanical engineer in the Iowa field, South Louisiana, and remained with that company until August, 1935. He was assistant general superintendent for Pan American Production Company before being promoted.

H. R. Funk, formerly field foreman for Pan American Production Company at Charenton, St. Mary Parish, South Louisiana, has been promoted to assistant general superintendent of production for the company with headquarters in Houston. O. H. Eichelberger has been appointed field foreman at Charenton, La.

Blank-Stoller

EARL V. HEWITT

J. M. FLAHERTY, office manager of Shell Petroleum Corporation, Tulsa, was reelected president of the Petroleum Accountants Society of Oklahoma at the annual meeting in Tulsa. Other officials are: R. L. Rush, Sinclair Prairie Oil Company, reelected first vice president; R. E. Parr, Phillips Petroleum Company, second vice president; M. H. Massey, Sanolind Oil & Gas Company, reelected secretary and treasurer, as well as director. Two new directors are A. W. Jahns, Tide Water Associated Oil Company, and L. E. Tustison, Carter Oil Company.

I. H. HUGHES has been appointed to the post of engineer in charge of electrical pumping equipment for Phillips Petroleum Company with headquarters at Bartlesville. He was district production engineer in the Texas Panhandle previous to the promotion.

W. J. HINCHEY, president and general manager of Kentucky Natural Gas Company, Owensboro, in an address last week termed this year's discovery of the Birk City field of Henderson and Daviess counties, Kentucky, to be of "great interest" to the industry. Pointing to the entry of Carter Oil Company, Gulf Refining Company, Pure Oil Company, Sun Oil Company and other major concerns into Western Kentucky since discovery of the Birk City pool, he added that "other promising localities have been marked for early prospecting leaving no doubt that Western Kentucky is at the beginning of a period of oil development of major proportions."

DONALD RICHBERG, Washington attorney and former administrator of the National Industrial Recovery Act, will speak before the annual banquet at the meeting of the Independent Petroleum Association of America in Tulsa, October 21. His acceptance completes the program which will continue from October 19 through October 21.

CHARLES DILLARD, formerly connected with Carter Oil Company operations in Kansas, has been transferred to Henderson, Kentucky, from where he will supervise activities in Western Kansas. He arrived in Henderson last week.

J. B. FISHER, secretary of Kendall Refining Company, Oil City, Pennsylvania, has been named vice president, succeeding the late Howard H. Greene. He will also retain the post of secretary.

BYRON BARTLETT, Midland, Michigan, was named chairman of the Midland County Petroleum Industries Committee organized last week. Other officers are Charles Denison, vice chairman, and Fred Elliott, secretary, both of Midland. Committees named are: Legislative—Ray Merritt, Coleman, chairman; Russell Glynn, Midland, vice chairman, and M. Blackhurst, Midland, secretary. Local affairs—Herman Majeske, Midland, chairman; A. Rhyne, Midland, vice chairman, and J. Dean, Midland, secretary. Public Relations—J. L. Ross, Midland, chairman, and B. Kararr, Coleman, vice chairman.

JOHN W. HERBERT, president of Herbert Oil Company, has returned to Fort Worth headquarters after spending the past three months at his summer home in South Hampton, Long Island.

CARL O. HUBBELL, ace pitcher for the New York Giants and an officer of Hubbell Production Company, owner of five wells in the K-M-A field, has established residence at Fort Worth, having moved from Meeker, Oklahoma.

J. D. COLLETT, Fort Worth, president of the Mid-Continent Oil & Gas Association for the past six years, is recuperating at his residence after being seriously ill since mid-August.

L. D. COADY, assistant to the president of Atlantic Petroleum Purchasing Corporation, Philadelphia, spent the past week at the company's Southwest district headquarters at Dallas.

C. E. LANGE and A. S. Mims, formerly working out of San Antonio, Texas, last week moved their offices from St. Louis to Centralia, Illinois, from where they will better be able to supervise their operations in the Centralia pool.

B. FRANK BRIDGES, manager of the Eastern division, Gulf Oil Corporation, is away from his Indianapolis headquarters and visiting Mid-Continent oil centers.

VISCOUNT CHAPLIN, of London, England, a director of the C. & E. Corporation, Alberta oil company, declared in Calgary last week that the British government should undertake development of Turner Valley and other West Canadian oil fields. Development of the Canadian fields, he pointed out, would make it possible for the British Empire to reduce imports from other countries.

W. F. KNODE, chairman of Alberta Petroleum and Natural Gas Conservation Board, left Calgary last week with his family for a short vacation at their home in Corpus Christi, Texas. He will return to Alberta in about three weeks, but his children, a boy and a girl, will remain at Corpus Christi to attend school.

FIRMIN V. DESLOGE, St. Louis, Mo., is president of Smokey Oil Company, which last week was admitted to do business in Illinois, with headquarters in Centralia. T. P. Desloge is secretary.

CAMPBELL M. HUNTER, O. B. E., president, heads directors of Hunter Valley Oil Company, Ltd., reelected when shareholders of the company held their annual

meeting in Calgary, Alberta, last week. Other directors named are W. B. Baird, H. Greenfield and Austin DeB. Winter. Announcement was made that the company will undertake another wildcat test on the Hunter Valley structure of Alberta if current negotiations for refinancing in London are successful.

WILLIAM M. FUNK, 53, oil well driller and a native of Casper, Wyoming, since 1916, died September 25 of sleeping sickness. He had been ill two weeks.

C. E. COOK has been named superintendent of Forest Oil Company at Bradford, Pennsylvania.

HOWARD BRYANT, geologist, and George Collins, attorney, are conducting a series of lectures at East High School, Wichita, Kansas, for oil workers. During the 12-week course, Bryant will review "Elementary Geology of Kansas Oil Fields," while Collins will discuss title and legal phases of the oil industry.

W. ROSS LEARD has been made production foreman for Magnolia Petroleum Company at St. Elmo, Illinois. He was formerly petroleum engineer for the company at Dallas, Texas.

J. C. DALLAS, president, heads directors of Roxana Petroleums, Ltd., reelected when shareholders of the Alberta producing company held their annual meeting in Calgary last week. Other officers are M. A. Van Roggen, E. W. Kolb, F. M. Graham, A. G. Graves, Baron De Vos Van Steenwyk and Elmer Johnson.

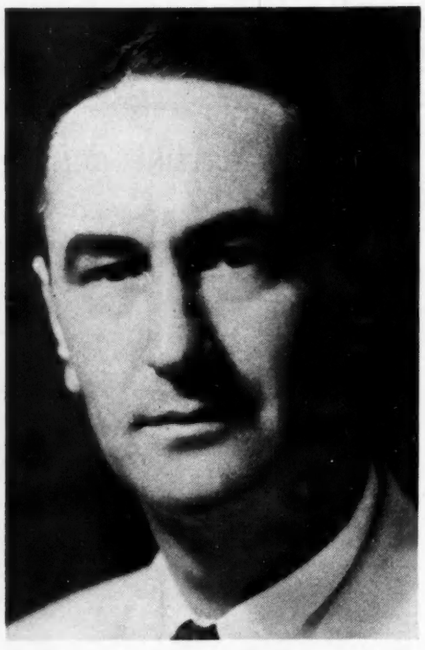
C. L. SUHR, chairman of the board of Pennzoil Company, reached Amsterdam last week from Weisbaden, Southern Germany. He plans to conclude his European trip this month, sailing for the United States with D. W. Grant, of the company, who left the United States for England a short time ago.

DIED:

P. B. (BARNEY) FLYNN, 54, manager of operations for Reno Oil Company, Wichita Falls, died September 30 in the latter city following an emergency appendectomy. He was a native of Pennsylvania, and engaged in oil operations before establishing residence at Mounds, Oklahoma, in 1908. He moved to Wichita Falls in 1927. Flynn championed the cause of the stripper-well operators. He was the first president of the North Texas Oil Gas Association, and his services were in demand for committee work with other oil bodies. He is survived by his wife, and two brothers, John Flynn, president of Reno Oil Company, and W. B. Flynn, Beaumont oil man.

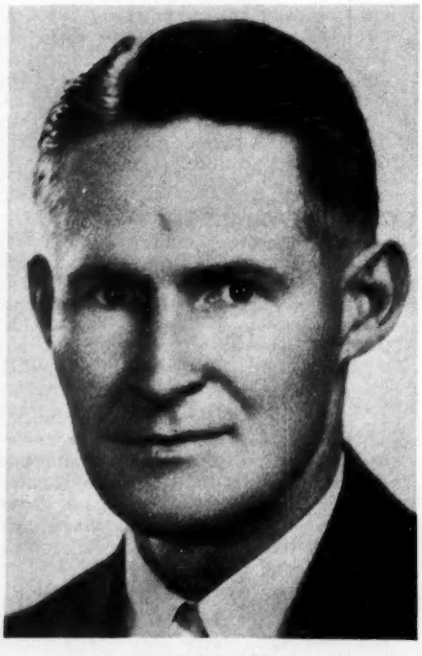
JOHN J. CORLETT, 82, president of Edenburg Oil & Gas Company, died October 1 at his home in Knox, Pennsylvania, following an extended illness.

PETER C. DINGS, 69, formerly active in oil exploration in Oklahoma and a member of the Mid-Continent War Petroleum Service Board, died October 1 in a Chicago hospital of a skull fracture suffered 10 days earlier when struck by an automobile. He was treasurer of Champlain Oil Company, Montreal, and was also prominent in banking and utility circles.



WM. V. GROSS

Foreign editor of *The Oil Weekly*, left Houston Friday by plane for Miami, Florida, thence Sunday flying to Trinidad, to begin a tour which will take him to all the principal oil producing regions of northern South America. His trip is for the purpose of getting first-hand detailed information on oil developments in the countries visited, for readers of *The Oil Weekly*.



W. C. BEDNAR

Has joined the University of Oklahoma as assistant professor of petroleum engineering. He formerly was with Phillips Petroleum Company and Amerada Petroleum Corporation, and has a wide experience in drilling and production methods. Bednar holds his engineering degree from the University of Oklahoma.

Swigart heads A.P.I. production nominating group

T. E. Swigart, of Shell Petroleum Corporation, Houston, Texas, has been appointed chairman of the American Petroleum Institute's Division of Production Nominating Committee. Under the Institute's Uniform Plan of Divisional Organization and Procedure, this committee will nominate, at the 19th Annual Meeting, to be held in Chicago, November 14 to 18 next, the 20 elective members of the General Committee of the division to serve for the coming year. Announcement of the appointment was made by George A. Hill, Jr., of Houston Oil Company of Texas, Houston, Texas, Institute Vice President for Production.

Membership of the committee follows:

P. R. Applegate, New York Transit Co., New York; L. L. Aubert, Bankline Oil Co., Los Angeles, California; George S. Bays, Stanolind Oil & Gas Co., Tulsa, Oklahoma; A. H. Bell, Continental Oil Co., Los Angeles, California; E. R. Filley, The Texas Co., Houston, Texas; H. J. Hawley, Standard Oil Co. of California, San Francisco, California; and Harry H. Hill, Standard Oil Co. of New Jersey, New York.

Also A. V. Hoenig, Indian Territory Illuminating Oil Co., Oklahoma City, Oklahoma; C. V. Millikan, Amerada Petroleum Corp., Tulsa, Oklahoma; R. W. Pack, Sun Pipe Line Co., Beaumont, Texas; Dewitt T. Ring, The Ohio Fuel Gas Co., Columbus, Ohio; John A. Ritter, Sun Oil Co., Dallas, Texas; H. M. Stalcup, Skelly Oil Co., Tulsa, Oklahoma; and Blaine B. Wescott, Gulf Research & Development Co., Pittsburgh, Pennsylvania.

Continental Oil Company announces employes' pension

Ponca City, Okla.—Continental Oil Company has announced establishment of a retirement and pension fund for all of its employes who reach the age of 65, in the case of men, and 60, in the case of women.

The plan, according to Dan Moran, president of the company, will be co-operative in character, employes making regular monthly contributions which will be supplemented by a contribution by the company. It will provide a minimum benefit of $30 a month, and in the average case the total retirement income, including the federal pension, will amount to a figure somewhere between one third and one half of the employe's salary.

For the older employes the company is providing a benefit in recognition of service already rendered.

"The new retirement and pension plan," said Moran, "was adopted by the directors of the company after authorization by the stockholders at the last annual meeting, and it is their opinion that it will benefit both the company and the employes."

The Texas Railroad Commission has scheduled a hearing at Austin on October 14 on the Argo sand of the South Hoffman field in Duval County. At this hearing the commission will seek to determine whether there is a foreign demand for additional oil produced from this sand.

State Governors Attend An Oil Man's Party

GIVEN opportunity to meet with men of politics, men of industry put a best foot forward. Such an opportunity for oil came September 29, a lull between the national conference of governors and the quarterly meeting of the Interstate Oil Compact Commission in Tulsa.

Governors, prospective governors, ex-governors, a senator, a congressman, scores of conservation officials, men and women whose livelihood comes from oil and a few score of "gate crashers," were guests of Frank Phillips, chairman of the board of Phillips Petroleum Company, at his Woolaroc (woods, lakes and rocks) in Osage County between Tulsa and Bartlesville. Inspection of the ranch museum, admiration of the hundreds of animals, the modern buildings and a feast of barbecued buffalo meat were the order of the afternoon and evening.

On such occasions men of oil would impress on men of politics that the industry is part of the industrial life of the nation and essential to social and economic well being, that the industry should not be shackled by harmful laws, is already over taxed and short on profit.

Present for this occasion was the Democratic nominee for governor of Oklahoma, Leon Phillips, who spoke his attitude the next day at the compact meeting, when he said he favored the compact as now authorized and without further encroachment of federal authority over the industry. He also hinted at adjustment of the tax load on Oklahoma oil producers.

Present also was the Democratic nominee for governor of Texas, W. Lee O'Daniel, whose remarks at the compact meeting the next day were humorous but pointed in a direction to leave men of the industry wondering. He mentioned the pledge of $30 a month for citizens of Texas beyond a certain age limit and said he was glad to find the oil industry prosperous.

Present was James V. Allred, prosecutor of the industry in Texas while attorney general, on a scale of asking for fines of $17,000,000 on a charge of state anti-trust law violation because of the old petroleum code.

Present was E. W. Marland, Oklahoma governor, who again will become an oil producer after January, 1939.

Present was the governor of Illinois, Henry Horner, of whom the industry seeks a conservation law, which the governor has promised to support.

Present and highly popular was the governor of Nebraska, R. L. Cochran, whose state has no oil production. The way the matter of taxes has been handled in that state placed him in high esteem.

Present and not pleased with the federal statute under which the Interstate Oil Compact exists, was Walter A. Huxman of Kansas, so far rebuffed in his effort to get the law changed and "teeth put in it."

Of one mind were all state officials, those from Kansas excepted, that control of the oil industry be left to the states.

Automobiles halted in front of the ranch museum until 1000 or more had collected for the picnic. Host Phillips is under the big white hat. In the middle, back to camera and hat in hand, is W. G. Skelly, president of Skelly Oil Company. At the exreme left, tall and white of hair, is Elmer Thomas, Oklahoma senator.

Colonel Art Gobel, winner of the Dole flight to Honolulu some years back, finishes off before the ranch lodge with a smoke screen after writing the letters F. P. R. (Frank Phillips Ranch) in the sky and Governor James V. Allred of Texas contributes his share of admiration. Upon completion of his second term as governor, he goes to a federal judgeship in Texas.

Proud of Phillips Petroleum Company is Frank Phillips, its founder and board chairman. Doubly proud is Frank Phillips of his Woolaroc ranch, a unit of some 20,000 acres of Osage County, which has been converted into a show place, wherein comfort has been added without destroying natural beauty.

His companion of the moment is Governor R. L. Cochran of Nebraska.

When a big party happens at the Woolaroc ranch, its working force don garbs to fit the popular impression of what the ranch worker wears day in and day out. Here a member of the ranch staff is inviting an automobile party to alight.

Left, strolling away toward the picnic, is Wesley E. Disney, Oklahoma congressman, member of the Ways and Means Committee, a man counted on when oil legislation comes before Congress.

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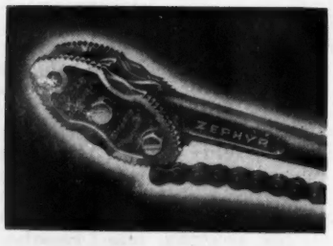
"BOLL-WEEVIL ZEPHYR" . . .

Greater strength with much less weight. Same structural and utility features as regular "Boll-Weevil", but heat-treated and equipped with ALLOY "Superchain". 3 sizes, for ¾" to 12" pipe.



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THE WEEK'S NEWS SUMMARIZED

Markets

Producers of Texas, Oklahoma, Kansas, and New Mexico late last week could not complain that extraordinary curtailment had been in vain, as the crude price postings in those areas were still being maintained generally, in the face of recent reductions in nearly all other sections of the country, except California.

However, tenseness prevailed in those states of the Mid-Continent, as the industry realized that a general crude price reduction still might materialize before the end of the week.

The anxiety was greatest, nevertheless, at mid-week, just after Standard Oil Company of Louisiana announced general reductions of 17 cents a barrel in North Louisiana and Arkansas and 16 cents in South Louisiana. For it was seriously doubted then if the old crude prices could be maintained much longer in other districts of the Mid-Continent, with the Arkansas and Louisiana fields competing for markets with the reduced postings.

The doubt was doubly great in view of the fact that Illinois fields had become more highly competitive since prices were reduced there 10 cents a barrel recently.

Back of all the crude price cuts and threats of cuts is an exceptionally weak gasoline market, which lost more ground last week, after having declined seriously for several preceding weeks.

So depressed has the gasoline market become that some refiners of the Mid-Continent have decided to close down their plants indefinitely, to avoid sustaining losses on operations.

Associations

The Petroleum Section of the American Institute of Mining and Metallurgical Engineers meeting at San Antonio last week put stress on the fact that it is important to know conditions down in the ground at all stages of oil development. Papers prepared for the meeting, many of which are abstracted in this issue, are the usual contributions to the literature evolved when this group of engineers get together.

This week the East Texas Chapter of the American Petroleum Institute Division of Production will have its session at Kilgore where enough problems in engineering are in sight of the meeting place to keep the boys interested.

Later in the month the Independent Petroleum Association of America has its annual meeting at Tulsa, along with the Stripper Well Association. A lengthy program includes live subjects and an able list of speakers.

Investigations

Pennsylvania, mother of the oil production, wants to spank it but continues having trouble deciding who will wield the club. The law makers on second thought are not sold on the idea of any of a legislative appropriation for an investigation going to any one except a member of their own body. And after it is all over the idea of making the industry a public utility will probably run into more obstacles that will cost the public some money and the industry a lot more.

Allowables

Texas will continue the Saturday-Sunday holidays, says a forecast from Austin based on Col. Thompson's opinion that it is good for the jitters that producers are having over the price situation. Not able to be forecast, however, is what will happen to the proposal that pipe line companies be required to prorate in all fields they serve when they cannot take all the oil offered in each spot.

Courts

Appeal ordinarily is reserved for the defendant in criminal prosecutions, but the attorney general is asking an appeal court to reverse Judge Stone on his freeing of certain defendants in the Madison trial. At Austin, hearing on the anti-trust suit that Governor Allred started seven years ago resolved itself into a conference a la Munich which logically ended in the aggressor getting a check.

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Oil in the Courts

Government attorneys continue fight on Stone decision in high court; Texas defendants pay

Government asks appeal court to rescind Madison order

Having lost an attempt to have Federal Judge Patrick T. Stone at Madison, Wisconsin, rescind an order by which he granted freedom to 1 major oil company and 10 oil company officials following a jury verdict of guilty returned last winter following trial on anti-trust charges, attorneys for the federal department of justice last week launched an action in the United States circuit court of appeals at Chicago to gain a second trial of those freed.

W. P. Crawford, special assistant to the United States attorney general who took part in the lengthy trial at Madison last winter, sought an order from Judge Evan A. Evans reinstating the indictments and vacating Judge Stone's dismissal order of July 19. The appeals court directed Judge Stone to show cause October 24 why the government's petition should not be granted.

Holding court in Superior, Wisconsin, last week, Judge Stone declared he had no comment to make on the appeals court order. A week ago he had refused a government request to rescind the order, rebuking prosecution attorneys for raising the point after he announced before giving the case to the jury in January that he would reserve rulings on motions for a new trial and to dismiss charges.

In the same order of July 19, Judge Stone granted new trials to 3 companies and 15 individuals, and sustained the verdict of guilty against 12 companies and 5 individuals, fining them a total of $65,000. An appeal from the latter part of the ruling is pending before the appeals court, while Judge Walter C. Lindley, of the federal district court at Danville, Illinois, will go to Madison October 14 to set a date for retrial of the 17 defendants.

Usurped Jury Function

The government, in its petition to the appeals court last week, contended that Judge Stone, in "purporting to pass on legal sufficiency of the evidence, arbitrarily usurped the function of the jury by weighing evidence against the 11 defendants and refused to consider substantial evidence in the record which established beyond reasonable doubt they were guilty of conspiracy as the indictments charged."

The government's move before the appeals court last week was described as a means of seeking review of a criminal case, inasmuch as a prosecution appeal is denied. While the order directed the Madison jurist to show cause why his ruling should not be upset, it is not likely that Judge Stone will have to appear before the Chicago court or to employ counsel to defend his position. Attorneys explained that his position could be explained by submission of the record of his order and the subsequent decision denying a government petition to rescind it to the appeals court. Signing of the order by the higher court was taken as an indication of the appeal court's acceptance of the case for review.

Defendants against whom Judge Stone dismissed the charges and who were involved in last week's action are:

Globe Oil & Refining Company of Kansas; Henry M. Dawes, Chicago, president, The Pure Oil Company; Jacob France, Baltimore, president, Mid-Continent Petroleum Corporation; Dan Moran, Ponca City, president, Continental Oil Company; Frank Phillips, Bartlesville, president, Phillips Petroleum Company; Edward G. Seubert, Chicago, president, Standard Oil Company of Indiana; W. G. Skelly, Tulsa, president, Skelly Oil Company; Allan Jackson, Chicago, vice president in charge of sales, Standard Oil Company of Indiana; Charles L. Jones, New York, vice president in charge of domestic trade department, Socony-Vacuum Oil Company; Arthur V. Bourque, Tulsa, secretary and treasurer, Western Petroleum Refiners' Association, and Bryan S. Reid, Chicago, general manager of Chicago Division, Socony-Vacuum Oil Company.

Get New Trial

Companies granted new trials, date of which will be set this week, are: Standard Oil Company of Indiana, Cities Service Company and Barnsdall Refining Company.

Individuals granted new trials are: Alexander Fraser, St. Louis, president, Shell Petroleum Corporation; E. B. Reeser, Tulsa, president, Barnsdall Refining Company; E. A. O'Shaughnessy, Minneapolis, president of Globe Oil & Refining Company; Edward L. Shea, New York, president, Tide Water Associated Oil Company; A. G. McGuire, Milwaukee, chairman of the board, Wadhams Oil Company; H. E. Brandli, New York, vice president and general manager, Cities Service Export Oil Company; Edward J. Bullock, Chicago, vice president in charge of purchasing for Standard Oil Company of Indiana; J. W. Carnes, New York, vice president, Sinclair Refining Company; Harry D. Frueuaff, Tulsa, vice president, Cities Service Export Oil Company; Harry J. Kennedy, Ponca City, vice president in charge of marketing, Continental Oil Company; Noel Robinson, New York, vice president, Tide Water Associated Oil Company; C. B. Watson, Chicago, vice president, The Pure Oil Company; A. M. Hughes, Bartlesville, sales manager, Phillips Petroleum Company; J. W. Warner, Tulsa, Tide Water Associated Oil Company, and O. J. Tuttle, Tulsa, tank car sales manager, Empire Oil & Refining Company.

Check ends seven-year trust suit at Austin

The Allred anti-trust suit begun seven years ago was concluded last week by a compromise judgment entered in the 98th District Court at Austin. The suit attacked several oil companies, Texas Petroleum Marketers Association and American Petroleum Institute for activities which were alleged to be in restraint of trade, and therefore a violation of the Texas Anti-trust Laws.

Through the compromise the oil companies agreed to pay $450,000, of which $25,000 attorney's fees which were paid to special counsel retained by the state and Travis County to prosecute the suit.

The judgment was entered against the Texas Petroleum Marketers Association and the other defendants were exempt from penalty directly, although, as members of the now defunct association, they paid the bill.

Listed as defendants were Standard Oil Company, Socony-Vacuum Corporation, Standard Oil Company of California, Shell Union Oil Corporation, Shell Petroleum Corporation, Humble Oil & Refining Company, The Texas Company, Gulf Refining Company, Pasotex Petroleum Company, Continental Oil Company, Sinclair Refining Company, Magnolia Petroleum Company, Simms Oil Company, Cities Service Oil Company, Texas Pacific Coal and Oil Company, The American Petroleum Institute, and The Texas Petroleum Marketers Association.

The compromise was suggested by Judge J. D. Moore who heard the case several years ago. He pointed out that the violations resulted from practices abandoned several years ago. Likewise, he pointed out that the federal courts had recently compromised suits at Madison and that there was a general tendency to speed litigation of this nature, especially in those instances where offenses had occurred several years ago.

Attorney General William McCraw declined to agree to any settlement of the case without the approval of Governor James V. Allred who filed the original suit. McCraw insisted that there were political, as well as legal questions involved, and that he felt it would be unwise to make a settlement without the governor's sanction. While Allred did not publicly approve this action, it was generally conceded that Attorney General McCraw finally agreed to the compromise after Allred had had an opportunity to discuss the question.

Pennsylvania land owner is the taxpayer

The Pennsylvania superior court last week ruled that owners of oil and gas lands must pay the taxes assessed against the lands unless agreements exist between the owners and lease holders providing the latter are responsible for payment of taxes.

The ruling came in an appeal from a decision of Judge Lee A. McCracken of the Venango County Common Pleas Court at Franklin taken by W. L. Baird, of Van, Texas, owner of 120 acres of land in Clinton Township. The lower court ruling was affirmed in a decision handed down by Judge William M.

Parker, of the superior court. Baird questioned a triennial assessment of $3,520 made on an estimated daily oil production of 7 barrels.

"We cannot grant relief sought for the reasons that there is a well-established and generally recognized custom in the oil region that in the absence of an agreement to the contrary, taxes are assessed to and payable by the owner of the land, or lessor," Judge McCracken had ruled. "A change in the general concept of the legal status of lessor and lessee at this late date would jeopardize and in many cases destroy large vested interests and valuable rights," and "by gradual developments an oil and gas lease has by common consent and practice been clothed with many of the incidents and attributes of personality and as such is not assessable as real estate."

Valvoline contests valuation report

Three federal judges at Pittsburgh, sitting as a statutory court, last week reserved decision on a request for a restraining order made by Valvoline Oil Company, of Warren and Butler, Pennsylvania, against the Interstate Commerce Commission, and asked both sides to file additional briefs. The company contends the commission cannot force it to file a report of its valuation because it is not a common carrier.

Market Situation

More price reductions in face of favorable stock situation, the latter bolstering hope that Arkansas-Louisiana cut will not spread

Further price reductions keep markets depressed

The market outlook remains clouded, following additional reductions of crude oil prices and further declines of gasoline prices within the past week.

Shut-downs of refineries in the Mid-Continent, as well as price reductions, have furnished evidence of the generally depressed markets.

Crude price reductions of the past week affected fields of Michigan, Oklahoma, Kansas, Arkansas, and Louisiana, and they appeared especially important because they had been preceded shortly before by reductions in Illinois, Indiana, Kentucky, East Texas, Lisbon (Louisiana), the Pennsylvania grade fields, and some other areas.

Logically, it was indicated that the price reductions might be extended generally throughout the Mid-Continent, although Texas producers hoped that they might escape the revision, because of the five-day production weeks that have been employed in curtailment of crude output in that state.

Meanwhile, the gasoline market has further slumped, additional reductions of prices having been made at the refineries and at retail outlets. Tank car prices in the Mid-Continent late last week were in many instances ⅛-cent a gallon lower than one week previously.

The depressed gasoline market finally has caused some Mid-Continent refiners to close down plants for indefinite periods, to await the restoration of profitable prices.

Statistics Bolster Courage

Nevertheless, courage is being maintained generally, in view of the fairly satisfactory statistical position of the industry and the continued strict control of operations.

Conservation officials of Texas asserted that no crude price reductions in the state were justified, inasmuch as production was being closely balanced with demand, while national inventories of crude were at the lowest levels for about 16 years.

The latest weekly statistics of the industry tended to support that hopeful view, having shown continued strict regulation of crude production, low crude runs to refinery stills, and continued withdrawals of both crude oil and gasoline from storage.

Furthermore, the allowables of the leading producing states for October are expected to result in a continuance of close balancing of crude output with market requirements.

Texas-Oklahoma Situation

Some market analysts found it hard to believe, nevertheless, that the generally prevailing crude prices in Oklahoma, Kansas, Texas, and New Mexico could be long maintained, in the face of recent developments. For the 10-cent cut in Illinois crude naturally tended to force a reduction of at least that much also in not far-distant Kansas and Oklahoma, while the Arkansas-Louisiana reductions put similar pressure on the markets for Texas and New Mexico crudes.

The recent developments apparently have endangered particularly the Oklahoma-Kansas crude markets, as the fields of those states now are confronted with keen competition from Illinois, while at the same time being obliged to divert more oil toward the Gulf Coast, a course that obviously must be difficult unless facilitated by price con-

Allowable Picture

Texas two-day shutdown probably will continue; Independents ask ratable taking by pipe lines

The Texas Railroad Commission has scheduled its next State-wide proration hearing for October 15 at Austin. Although Texas has consistently produced less during October than consumer demand as estimated by the United States Bureau of Mines, there is no reason to believe that the Saturday and Sunday shut downs will be lifted after the hearing.

Last week Commission Chairman Ernest O. Thompson pointed out that, while the statistical position of the industry was fine, there was still evidence of "jitters" among the oil fraternity, as indicated by the Louisiana price cut. This reduction seems to indicate that proration to consumer demand has nothing to do with the price, since the reduction came at a time when above-ground storage was declining steadily and at a time when there was no indication that state regulatory bodies would not be able to control production during the winter months.

Probably the most interesting subject for discussion at the hearing will be the proposal made by the Independent Petroleum Association of America that the state regulatory bodies, including the Texas Railroad Commission, provide in their orders that pipe line companies must take the full allowable in all fields, or if they find it advisable to make a reduction in one field, make similar reductions in all fields to which they are connected. The suggested order read as follows:

"Because in the exercise of its jurisdiction the (here insert the name of the state regulatory body) has fixed the allowables in the foregoing order according to law in such manner as equitably to allocate among the various pools in the state their several portions of allowable production during the period covered by this order and in order that no common purchaser of oil within this state may unduly disturb such equitable allocation made by the commission, it is further ordered that no common purchaser of oil within this state shall limit its production from any lease or property in any pool below the allowable fixed for such lease or property unless at the same time and during all times of such limited purchase such common purchaser limits its purchase from all properties from which it is purchasing oil to the same extent."

This plan is likely to meet with opposition from producers in those fields where there is a firm market for all the crude allowed, even though the pipe line company buying there may be declining to take the full allowable from some field geographically remote.

cessions, to compensate for relatively heavy transportation charges. Thus it appears that Oklahoma and Kansas are in danger of losing the 10-cent price differential that they have enjoyed for a long period over the Mid-Continent section of Texas. That differential was established when Texas was considerably out of line on its proration enforcement and when East Texas was a market disturber.

Standard Explains Reduction

Some hope that Texas and New Mexico might escape the crude price cutting was given by the Standard Oil Company of Louisiana's explanation of its Arkansas-Louisiana revisions. The explanation indicated that the crude markets in those states had been unsteady for several months. In Texas, on the other hand, there has not been definite weakness of the crude markets except in local situations.

"For some months," stated the Standard of Louisiana announcement," crude oil in increasing amount has been sold by others at prices substantially below our posting for crudes of like quality purchased in the same general territory. During the month of September as much as 25 percent of the crude in North Louisiana and Southern Arkansas moved at prices from 15 to 20 cents per barrel below our posted prices. The Schuler, Lisbon, and Jennings fields alone have been producing 50,000 to 60,000 barrels per day of crude, almost all of which has been moving at prices below our schedules. In addition there are a number of other fields in this area in which crude is being sold at prices materially under our postings. The products from these lower priced crudes are moving into direct competition with the products from our refinery, and we have, therefore, been forced to revise our crude oil postings downward."

Oklahoma-Kansas crude oil market displays weakness

Weakness of the Mid-Continent crude oil market brought the first price break since last spring when Kanotex Refining Company, Arkansas City, Kansas, reduced its posting 15 cents a barrel, to reduce 40 gravity and above oil to $1 by this purchaser, whose price already was 15 cents lower than the posting of major buyers.

Along with this came announcement that Barnsdall Refining Corporation would close its Barnsdall, Oklahoma, plant October 15. Reason for the shutdown is inability to make a profit on operations. The plant has been running 4000 barrels daily, part of the crude coming from Osage County wells of Barnsdall Oil Company and part from other producers in the area.

This was the third Oklahoma refinery to close within a month. During September Casco Refining Company, Wynnewood, closed and withdrew as a purchaser in the Robberson pool. Ootober 1 Eason Oil Company closed its plant at Enid. Connections of Eason Oil Company in the Garber pool were taken over by Champlin Refining Company, Enid. Closing of the Casco plant left some producers in the Robberson pool without a market. When this plant was put back in operation last year it took over the gathering system of Magnolia Petroleum Company in the Robberson pool. When it withdrew Magnolia Petroleum Company began taking oil from its wells only.

In announcing the closing of its plant Barnsdall Refining Corporation gave the low price of finished products as the reason for the decision and added that it would resume operations whenever the price structure justified. The letter to producers from whom it purchased read in part:

"Barnsdall Oil Company has production of its own in the Osage and will, of course, try to find an outlet for it. If successful we will be glad to advise you. If you find a market for your production we will appreciate having you advise us.

"We have for some time realized that unless prices for refined products advanced the refining corporation would be forced to discontinue its operations, but we hoped something would happen to permit them to at least break even in their operations. Under the circumstances there is no other alternative for this company but to take the action referred to above."

White Eagle, Division of Socony-Vacuum Oil Corporation withdrew last week as a purchaser of oil in the Lost Springs pool, Marion County, Eastern Kansas. It was the only purchaser in the field and had been taking 300 barrels daily. The gathering system in the field is owned by Stanolind Pipe Line Company, from which it had been leased to White Eagle.

Industry's statistics continue favorable

The industry has continued to hold crude oil production and refinery runs down to comparatively low levels, and further withdrawals have been made from the stocks of both crude oil and gasoline, although the seasonal building up of fuel oil storage has proceeded.

These are the salient facts revealed in the latest weekly statistics of the petroleum industry.

Production and Runs

United States crude oil production in the week ended October 1 averaged 3,231,800 barrels daily, having dropped off 20,000 barrels from the week before, and it was 11.4 percent lower than in the corresponding week last year.

Crude oil runs to stills in the week of October 1 averaged 3,235,000 barrels a day, having risen 15,000 barrels from the previous week's rate. Despite the increase, however, the runs were 4.9 percent lower than in the comparable week last year.

Crude Stocks Decline

Crude oil stocks in the United States were reduced about 650,000 barrels more in the week ended September 24, when they came down to 280,278,000 barrels, a new 16-year low level. At that figure, the crude stocks were 9 percent smaller than a year previously.

Gasoline storage was reduced contraseasonally again, when it declined slightly in the week ended October 1 to 68,602,000 barrels. The stocks then were 5.1 percent larger than one year before. Gasoline demand is expected, however, to be only about 2 percent larger in October, 1938, than in October, 1937.

Gas and fuel oil stocks continued to rise, having increased about 1,300,000 barrels in the week ended October 1, to a new all time peak of 151,759,000 barrels. At that point, they were 29.6 percent higher than at the corresponding time last year.

Crude and refined oil prices decline more

Prices in the industry underwent some further important reductions during the past week, from well to retail outlet.

Crude oil prices were lowered in several widely scattered areas, and gasoline tank car prices came down some more in the Mid-Continent, despite sharp declines in earlier weeks.

Arkansas-Louisiana Crude Cut

Crude oil price cutting spread importantly into the Mid-Continent October 5 when Standard Oil Company of Louisiana reduced postings throughout North Louisiana and Arkansas 17 cents a barrel, except Rodessa which was cut 20 cents and Smackover, which was cut only 2 cents because of already having been reduced 15 cents a short time ago. Prices in South Louisiana fields were reduced at the same time 16 cents a barrel.

On the same date Kanotex Refining Company, an independent refining concern, reduced its postings for Oklahoma and Kansas crudes 15 cents a barrel.

Michigan Prices Reduced

Crude prices have been reduced lately also in Michigan. Allegan district crude, Southwestern Michigan, was cut 5 cents a barrel originally and then a few days later, on October 4, it was cut 5 cents more, having been lowered finally to a new price of $1 a barrel.

In Central Michigan prices were cut October 1 from 6 to 9½ cents a barrel, depending on the fields where produced.

Standard of Louisiana Schedules

The new schedule of Standard Oil Company of Louisiana for North Louisiana fields ranged from 73 cents for below 25 gravity, and 75 cents for 25-25.9 gravity, by 2 cent differential, to a top price of $1.05 for 40 gravity and above.

For Buckner, Magnolia, and Village fields, Arkansas, the new Standard Oil Company schedule ranged from 66 cents for below 25 gravity, and 68 cents for 25-25.9 gravity, by 2 cent differential for each degree of gravity, to a top price of 98 cents for 40 gravity and above. For Smackover heavy crude a flat price of 73 cents a barrel was posted.

For Roanoke, North Crowley, Darrow, and Choctaw fields of South Louisiana, the company posted 74 cents for below 21 graity, 77 cents for 21-21.9 gravity, and 3 cents more for each degree of gravity upward through 92 cents for 26-26.9 gravity; 94 cents for 27-27.9 gravity, and 2 cents more for each degree additional gravity to a top price of $1.20 for 40 gravity and above.

Natural gasoline grade 26-70, was priced generally in the Mid-Continent markets f.o.b refineries at 2¾ cents a gallon, and sales were reported at that same price f.o.b. Breckenridge, Texas.

Gasoline at Refineries

U. S. motor gasoline ranged in the Oklahoma market last week about as follows: 62 octane and below 3¾ to 4⅞ cents a gallon; 63 to 66 octane, 4¼ to 5⅛ cents; 67 to 69 octane, 4⅜ to 5⅜ cents; 70 to 72 octane, 4⅝ to 5⅝ cents.

Corresponding prices in the Chicago markets were 3⅝ to 4⅜ cents, 4⅛ to 4⅞ cents, 4¼ to 5 cents and 4½ to 5⅛ cents.

In East Texas the most common gasoline, 60-62, 400 end point, was priced generally at 4½ cents a gallon.

Kerosene prices f.o.b. Oklahoma refineries ranged from 3¾ to 4¼ cents a gallon for the 41-43 water white grade, and from 4 to 4⅝ cents for the 42-44 water white grade; and corresponding prices in the Chicago market were 3¾ to 4¼ cents and 3⅝ to 4 cents.

Fuel oil prices were not materially changed in the past week. In the Chicago market range oil was priced from 3⅝ to 4 cents a gallon. The No. 1 white oil was priced from 3⅝ to 3⅞ cents, and No. 1 straw from 3⅝ to 3¾ cents. No. 2 straw was 3½ to 3⅝ cents. No. 3 oil was 3¼ to 3½ cents. No. 5 oils were 60 to 70 cents a barrel. The No. 6 oil was quoted at 35 to 50 cents.

Michigan crude prices 6 to 9½ cents lower

Following a 7-cent-per-barrel cut September 27 for Southwestern Michigan grades, the Michigan crude price structure all but collapsed during the past week, with "dollar oil" still prevalent but facing an uncertain future.

Tri-Lakes corporation, subsidiary of Standard Oil Company of Ohio, which bought out Simrall Pipe Line Corporation's Southwestern Michigan gathering system September 25, immediately posted a 7-cent cut for Allegan and equal grades. The cut dropped the price from $1.12 to $1.05 per barrel. Both Naph Sol Refining Company and Commonwealth Pipe Line Company, the other two Allegan-Van Buren crude buyers, met the cut.

Effective October 1, Simrall Pipe Line Corporation, an affiliate of the Michigan-Toledo Pipe Line Company, partly owned by Standard Oil Company of Ohio, posted new prices for Central Michigan grade crudes ranging in cuts from 6 to 9½ cents per barrel. This cut was met within 24 hours by other Central Michigan carriers.

The new schedule is as follows:

Field	Old Price	New Price
Buckeye and equal grades	$1.09½	$1.00
Edenville and Freeman	1.09½	1.00
Porter and equal grades	1.12	1.02½
Sherman and Crystal	1.12	1.02½
Arenac and West Branch	.90	.84
Adams (Arenac)	.94	.84½
Allegan	1.12	1.00*

Two days after the general Central Michigan drop, Tri-Lakes posted a second 5-cent drop to establish the price as of October 4 at $1, or a 12-cent drop over a 10-day period.

Leading factors in the general price cut (first since January 6, 1938, when $1.27 oil was cut to $1.12 and $1.24½

[*Continued on page 72*]

A. I. M. E. Meeting

Importance of knowing subsurface conditions stressed in discussions of Petroleum Section

Knowledge of the actions that take place in subsurface oil producing reservoirs during all periods of development and while performing certain operations is becoming of increasing importance in the procurement of greater efficiency in the operating branches of the industry. This was conclusively indicated at the Petroleum Section meeting of the American Institute of Mining and Metallurgical Engineers in San Antonio last week, where two score papers dealing with various phases of subsurface conditions and problems provoked wide interest and enlightening discussions.

Gone are the days, which existed until an exceedingly short time ago, when only the oil placed in surface tanks within a single 24-hour period was considered and tomorrow was left to take care of itself. In their place has arrived an era in which petroleum engineers expect to be able, even during the early life of fields, to determine numerous reservoir conditions that will not only permit them to make more accurate estimates of ultimate recoveries, but also to adopt proper well spacing, drilling and producing methods that are particularly suited for each individual field and which will return a much larger percentage of the oil trapped in the structure.

Knowledge of surface conditions and their reactions during the various stages of production has been exceedingly limited until very recent years. During the course of the last three years much headway has been made, and numerous experiments recently conducted or still in process that were described at the A.I.M.E. meeting forecast vast advancements in the near future. They added much to the industry's knowledge of cements, clays, reservoir interfacial tension, flow of oil-water mixtures, various core analyses methods and their application, reservoir hydrocarbons, acid treatment and other operations.

Some of the papers presented at the meeting are abstracted below:

Development and Production Problems in High Pressure Distillate Pools

By E. V. FORAN,
Parker, Foran, Knode & Boatright

Among the many newer disclosures in the course of the petroleum industry's progressively deeper exploratory drilling is the increasing frequency with which operators are encountering reservoirs whose products, at the time of the discovery, exist wholly or predominantly in the gas phase, and which are commonly referred to as "distillate fields."

The occurrence of these pools has been observed under many different surroundings. In some cases the entire reservoir is filled with the wet gas containing its water white condensible products in the gas phase, but apparently with no dark oil or other hydrocarbon liquids in the reservoir. In other cases, the wet or distillate bearing gas may form large gas caps directly overlying and in contact with extensive reserves of dark oil. There also are cases in which the wet distillate bearing gas occupies nearly the entire reservoir space, the dark oil occupying only a narrow band-like area following the boundary of the reservoir along its lowest productive contour.

Although the reservoir contents of the distillate type pool may all be in the gas phase at the time of discovery, they do not long remain so if, during development, any appreciable decline in reservoir pressure takes place. Some of the heavier hydrocarbon vapors, a large portion of which lie within the range of motor fuel fractions, will condense or precipitate in the reservoir if the pressure is lowered even though no change in temperature takes place. In this respect the deep high-pressure reservoirs of wet gas react to pressure decline in a manner exactly opposite to that of the shallower wet gas reservoirs. This phenomenon is known as "retrograde condensation." It follows then that any mode of development or operation which results in a measureable decline in the reservoir pressure will have an adverse effect on the ultimate recoveries of the condensible contents of the reservoir. Moreover, the rate at which the pressure decline takes place will have no bearing on the extent of condensation within the reservoir.

It seems reasonable to believe condensation occurs throughout the porous section of the reservoirs and results in the wetting of the sand or lime surfaces surrounding the pores of the formation, but not of such quantity that would result in a surplus of liquid which would gravitate downward to the lower sections of the sands to concentrate there as a free liquid except in the immediate area of the well bore, where, of course, this is entirely possible. It may also be concluded that the character of the first products to condense will be composed of the heaviest components of the gas and gradually becoming higher in gravity as the pressures progressively decline.

A program of development of the distillate type pool calling for a high order of pressure maintenance by means of recycling the residue gas assures a proportionately high order of sustained potential open flow of the producing wells, and therefore is even better suited to a very wide spacing program than a dry gas pool and with no disadvantages. In the case of those gas pools of low condensible content, it is imperative that wide spacing be

adopted in order to render them commercial projects.

In all distillate type pools, it would be of great advantage to complete wells with large size casing set on top of the producing formation and to expose as large an area as possible in the well bore in order to reduce to the minimum, the pressure gradient surrounding the immediate well bore for any rate of flow. A large diameter casing will accomplish this. With this type of completion, it is possible to deliver the gas from the reservoir to the well bore with pressure drops of only a few pounds below the shut-in reservoir at rates of flow even up to the full open-flow capacity of 2-inch tubing. This condition will proportionately reduce the amount of local precipitation around the well bore.

Since all observations and data compiled indicate that precipitation of vapor phase products within the reservoir are the results of pressure decline alone, it is evident that the only means of neutralizing the evil effect of such decline lies in the adoption of a plan whereby the recycling of the residue gas may be carried on coincident with development and producing operations and continue until such time as the unstable distillate bearing gases have been wholly or partially displaced by the returned residue gas.

Influence of Oil Flow on Water Content

By NICO VAN WINGEN,
University of California

Experiments performed with distilled water, unconsolidated sand and dead oil for the purpose of determining the influence of oil flow on the water content of sands were described. While results found are not necessarily, therefore, identical to those that would be obtained under natural petroleum reservoir conditions, the following conclusions were drawn:

1. When oil under constant head is flowed through an unconsolidated sand, the amount of water retained in the core is inversely proportional to the specific permeability of the core. This corroborates the view that the degree to which oil displaces water out of the pore space is limited by the size of the pores.

2. For the range investigated, the displacing action of a more viscous oil of higher specific gravity was found to be the same as a less viscous oil, or lower specific gravity.

3. The amount of interstitial water retained in the sand bears an inverse relationship to the pressure head of the displacing liquid.

4. The degree of retained water saturation of the sand appears to approach 100 percent as the specific permeability approaches zero.

5. For the higher values of specific permeability and for the pressure range investigated the remaining amount of water in the sand occupies approximately 10 percent of the pore space. This, together with the fact that the limiting oil velocity curve approaches approximately 10 percent water saturation as an asymptote, indicates that beyond this point removal of water is achieved only by a stripping of the grains requiring considerable pressure drops across the sands; or by a balancing of the molecular forces.

6. As the water saturation of the sand exceeds approximately 15 percent of the pore volume, the permeability of the sand to oil decreases rapidly.

7. Sands with water saturations as high as 40 percent were found to produce 100 percent oil.

Physical Properties of Hydrocarbons and Their Mixtures

By E. R. GILLILAND, R. V. LUKES and H. W. SCHEELINE,
Department of Chemical Engineering, Massachusetts Institute of Technology

Knowledge of a large number of the physical properties of the hydrocarbons is needed in the calculations and studies of the production engineer. The use of generalized correlations has developed rapidly in the last decade. The generalized correlations of PVT, enthalpy and vapor = liquid equilibria, on the basis of reduced temperatures and pressures, are outstanding examples of this development. These correlations are of particular value to the production engineer interested in the flow of oil and gas, since they can be used to estimate the conditions under which segregation of phase occurs as well as the composition, density and relative amounts of the phases.

It was explained that a considerable amount of experimental data is needed to check the accuracy and increase the utility of these correlations. The authors presented a preliminary report of the apparatus being used and some of the results obtained at the Massachusetts Institute of Technology. In all cases this work is being particularly directed to the study of the mixtures rather than of pure components. However, in the study mixtures, certain problems arise such as the difficulty of obtaining a number of pure hydrocarbon components of known physical properties and the difficulty involved in the accurate analysis of such mixtures. For these reasons mixtures containing not over three or four pure components appear to be the most promising at the present stage of development.

Squeezing Cement Against Permeable Formations

By C. P. PARSONS,
Vice President, Halliburton Oil Well Cementing Company

The success of squeeze cementing in shutting off excessive water and free gas without shutting off the oil, even though cement slurry is imposed under pressure against all three portions of a producing formation, is due to several reasons.

1. Squeezing technique whereby, prior to the introduction of cement slurry, water is first forced to flow from the well into the formation where it will selectively follow water or free gas into the formation and then, without stopping the flow, cement slurry is pumped so that it will try to follow the water into the formation and will definitely and completely fill all the spaces in the formation with sufficient permeability for the cement particles to enter. This is now accomplished by non-squeezing methods.

2. The imposition of high pressure on the cement slurry against the permeabile pores of the formation, causing excess water to be squeezed out of the slurry, but leaving a very dense cement tightly compacted in the eroded spaces in the formation.

3. The eroded spaces are greater in the water and gas bearing portions of the formations than in the oil bearing portion.

4. The compressibility of free gas.

5. The use of the new slow-setting, high-temperature cements which allow greater time for squeezing cements in deep wells.

When sands do not have sufficient space in their water or free gas-bearing portions to accomplish desired results with an open-hole squeeze job, successful results can be obtained by squeezing cement slurry behind drillable or nondrillable liners and then selectively perforating and squeezing off water and excessive gas until clean, pipe line oil is obtained with a reasonable gas/oil ratio.

Common Characteristics of Cement and Proper Field Usage

By I. F. BINGHAM,
Universal Atlas Cement Company

Within recent years the development of oil well cements has progressed far in advance of the art of the oil industry to secure the most from them. Future improvements in oil well cementing results must come largely through intelligent choice and proper use of cements available. There is available a type of cement suitable for every oil well cementing operation. Further, any specific cement is within very narrow limits constant in its reactions. But there are present at every cementing operation a set of factors which influence the performance of the cement. Most of these factors if not controlled or eliminated tend to produce less satisfactory performance on the part of the cement than would be observed for the same cement in the laboratory.

The best practical rules for improvement in oil well cementing results are:

1. Keep in mind that the well investment is out of all proportion to the cost of cement which safeguards the investment. A small additional cost for the cementing operation may constitute a profitable addition to the investment.

2. Select the type of cement on the basis of conditions for placement.

3. Keep the water-cement ratio as low as is practically possible for the cement in question.

4. Detect and eliminate so far as possible the interfering influences at the job.

Sulphate Resisting Cement

By SVEND RORDAM and CEDRIC WILLSON,
Trinity Portland Cement Company

Of the various salts which commonly occur in corrosive waters, sodium sulphate, magnesium sulphate, and magnesium chloride, are the most destructive to cement. Corrosive sulphate salts are found in natural ground waters encountered in drilling oil wells in many fields, consequently their effect on the cement slurry used in oil well cementing has been the subject of considerable thought and study during the past three years.

The rate of attack on hardened slurries by solutions of sodium sulphate and magnesium sulphate is governed to some extent by the concentration of these salts in the water. However, for both compounds, a limiting concentration exists beyond which a further increase only raises the rate of attack slightly.

Temperature has an important effect on the resistance of hardened cement to the destructive action of sulphate solutions. Several investigators have observed that high temperature curing of cement specimens will greatly increase

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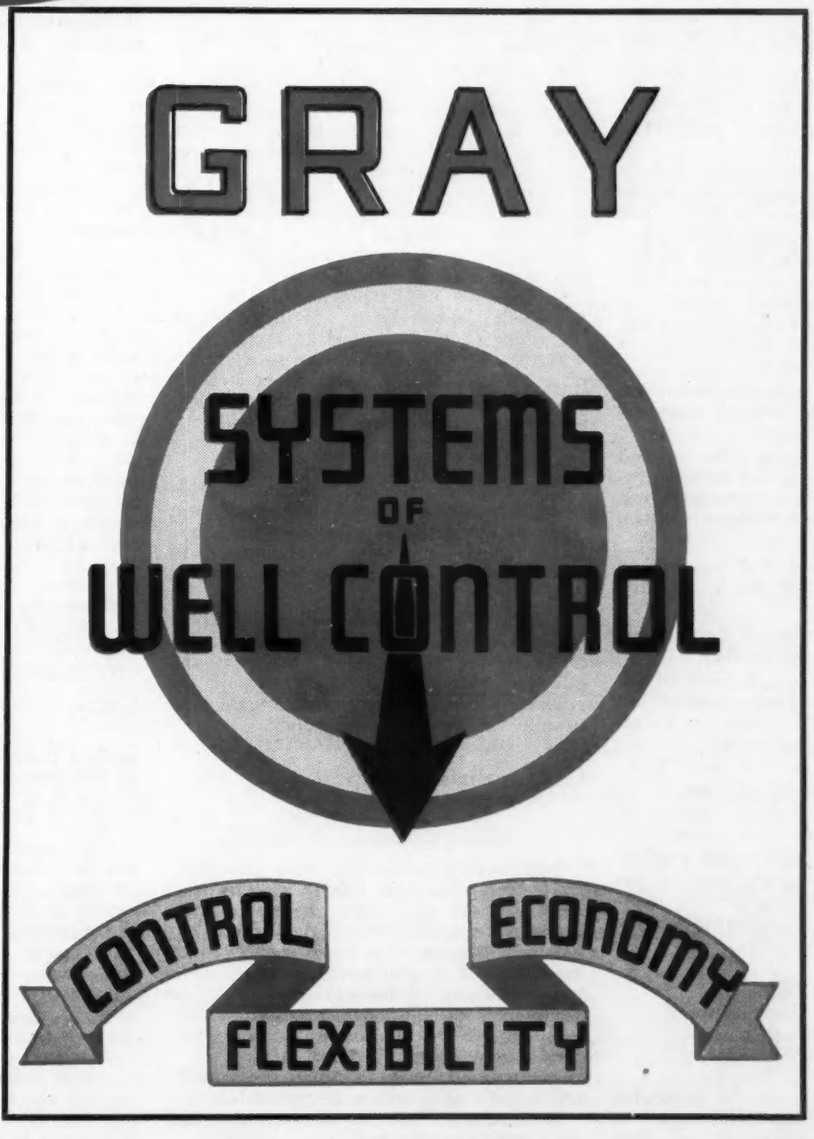

That these systems are complete in their consideration of the problems involved, or likely to be encountered, is attested by their successful operation on land and water without losing control in over 7000 completions.

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their resistance. It appears that the need for a sulphate resistant cement is more important when the corrosive waters are encountered at lower temperatures in shallow production than it is in the deep wells where temperatures may be as high as 200 degrees or more. However, a cement which is resistant to the attacks of sulphate waters at low temperature is bound to be even more resistant at the higher temperatures.

Surface and Interfacial Tensions of Oil-Water Systems in Texas Oil Sands

By H. K. LIVINGSTON,
University of Texas

Experimental work of this investigation involved determination of the viscosity of crude oil, specific gravity and surface tension of the crude oil and of connate water occurring with those oils, and interfacial tension between oil and the water, which occurred together.

The conclusions drawn from a study of 40 samples were:

1. The range in variation in oil surface tension is only plus or minus 11 percent from the average of 30.4 dynes per centimeter.

2. The range of variation in surface tension of water in petroleum reservoirs is from plus 4 to minus 23 dynes per centimeter from the value of 72 dynes per centimeter for pure water.

3. The range of variation in interfacial tension of naturally occurring oil-water systems is plus 67 percent and minus 31 percent from an average of 20.4 dunes per centimeter.

4. No particular correlation exists between surface or interfacial tensions and geologic formations.

5. Antonow's rule cannot be applied to naturally occurring oil-water systems, interfacial tension instead tending to vary directly as surface tension of the crude.

6. In general, interfacial tension is higher for crudes of high specific gravity.

7. In general, interfacial tension is higher for more viscous crudes.

8. The temperature coefficient of interfacial tension with free vaporization is approximately =0.2 dynes per centimeter per degree Fahrenheit below 100° F. and =0.1 from 100° to 130° F.

9. In general, interfacial tension is higher for more greatly saturated crudes.

10. The results included and further extension of similar work can be applied to problems of water encroachment, water flooding, accidental water penetration, and emulsions.

Some Application of Core Analyses to Oil Field Development

By WILLIAM L. HORNER and
JAMES A. LEWIS
Core Laboratories, Inc.

Certain serious losses can be prevented and more profitable operation can be achieved by taking advantage of data available from core analyses.

Notable success in applying core analysis data to water flood engineering has been brought to light by experience. Operators have been able to determine proper sections to expose and shoot, rates of water input and oil yield, ultimate yield, pressures and spacing relations.

Early attempts to procure ultimate yield and productivity data in flush fields of the Gulf Coast left no doubt as to the inadequacy of conventional analytical technique. Further research resulted in the development of a field service with truck-mounted, self powered laboratories. The results are available before the arrangements for completion have been chosen.

Three pertinent fundamental measurements are usually reported from core analysis—permeability, porosity, amount and gravity of oil saturation. Valuable information is available from these tests but to fit into the production development program it is essential that they contribute to reliable predictions and estimates of the behavior of wells and reservoirs. By correlating the data with well behavior in a large number of cases, relationships are found which are used to predict behavior from analysis.

The value obtained by measuring porosity, permeability, saturation and criteria related to water productibility should be considered at once in evaluating a sand section. This seems accomplished best by use of a coregraph, which delineates the variations in the favorability to production throughout the cored section.

Use of this graph commences less than 30 minutes after recovery of each core. Decision to set pipe or to cut another core is rendered in hundreds of instances with greater assurance.

In the case of natural hydraulic drives, it is apparent from coregraphs and confirmed by production history that many wells producing intermediate or top water are plugged back with the resultant serious loss of production from the less permeable layers below, through which the water could not travel as rapidly.

A means of predicting the productivity of a well from data presented on a coregraph has been established by the excellent agreement between permeabilities and productivities in areas of widely differing conditions.

Computations of the ultimate yields from currently developed fields have been made by the material balance method. Ultimate yields may also be computed in prorated fields by applying core analysis data.

Choice of an optimum well spacing plan is by no means a problem to be left entirely to the core analyst, but new and effective means of aiding the audit of reservoirs for productivity and yield may fit into the program and policy.

Core Analysis

By HOWARD C. PYLE and
JOHN E. SHERBORNE
Union Oil Company of California

Satisfactory equipment and procedure have been developed for making routine measurements of certain physical characterestics of sands and of their fluid contents. These methods have proved to be rapid and of a satisfactory accuracy.

Correlations following core analysis work have established:

1. An inverse relationship between permeability and water saturation;

2. An increase in specific productivity index with an increase in permeability;

3. A relation between oil saturation and oil characteristics; and

4. An inverse variation between interstitial water salinities and electric-log resistivities.

The application of these correlations make possible the prediction of the relative productivity of a cored interval and the nature of the producible fluids. Core analysis data aids both in drilling exploratory wells and in producing fields where gas and water production may be encountered.

A major value of core analysis work is the accumulation of data pertinent to the estimation of reserves by volumetric methods. Producible sand classification and porosity are directly obtainable, while connate water and non-recoverable oil factors are available from generalized correlations.

Effect of Pressure Reduction Upon Core Saturation

By H. G. BOTSET and M. MUSKAT
Gulf Research & Development Company

This paper described experiments undertaken for the purpose of determining, if possible, any relationship which might exist between the saturation of a core at the surface and its original fluid content.

While from the point of view of the problem of bringing a core up a well bore, the study indicates the specific result that the production should be on the order of 25 to 30 percent, with little or no loss of water unless the sands have abnormally high water contents, the experiments also are of interest from the standpoint of general production problems. For in principle, the process of bringing a core up a well is nothing more than permitting a small sample of the reservoir to go through its complete production history. However, the gradients in such a process are very much higher than anything that would occur in an ordinary producing sand except in the immediate vicinity of the well bore. Such an accelerated history will lead to recoveries considerably higher than will be determined by the main body of the sand at great distances from the well bore. Unfortunately, advantage cannot be taken of the greater recoveries possible under the high rate of pressure decline, but one must rather accept the low rates that will obtain in practice and study the system under such conditions. From this point of view, experiments of the type described with the associated technique should provide a means of predicting the order of magnitude of the ultimate recoveries when the rates of pressure decline are kept at very low values. Fortunately, it was not found necessary to keep the rate of decline down to the infinitesimal values, and experiments in which the pressure is released over an interval of 24 to 48 hours should suffice to give results of reasonable reliability.

A New Porosimeter for Determination of Porosity by Gas Expansion Method

By A. B. STEVENS,
A. & M. College of Texas

This paper described a new porosimeter for determining the effective porosity of oil reservoir rocks with a speed and accuracy comparable to the Washburn-Bunting method. Because it is so designed that the mercury does not come in contact with the sample, this new porosimeter has the advantage that the sample is left in its original condition and be used for any further test.

The new porosimeter has a heavy glass capillary tube fitted with a stopcock at the top and calibrated in 0.05 ml. divisions, starting from zero at the stopcock plug. The main body of the instrument is made of steel and consists of a core chamber connected to an expansion chamber by means of a small opening which is provided with a stopcock. The core chamber is closed by means of a screw-cap. Heavy rubber tubing connects the bottom of the expansion chamber to a mercury reservoir. A short length of glass tubing is inserted in the rubber tubing just below the expansion chamber to enable the operator to locate the level of the mercury.

Significance of the Critical Phenomena in Oil and Gas Production

By D. L. KATZ,
University of Michigan
and C. C. SINGLETERRY
Universal Oil Products Co.

While the critical phenomena have been studied during the past century, knowledge of the critical temperatures and pressures of complex hydrocarbon mixtures still is very limited.

Sufficient data has not been accumulated for drawing definite conclusions concerning the critical phenomena as applied to all gas and oil mixtures. However, data obtained in experiments has shown that hydrocarbon vapors may give gas-liquid ratios of 5000 to 10,000 cubic feet per barrel of liquid and that ratios for saturated liquids are unlikely to pass 5000 cubic feet per barrel of residual liquid for any natural fluid.

Critical temperatures, which is that point for each gas above which it cannot be liquefied, were shown to have little significance if the pressure is appreciably below the critical pressure. Retrograde condensation may occur upon isothermal expansion of vapors coming from a two-phase system below its critical temperature, because the vapors must be considered in terms of the phase diagram after removal from the two-phase system and hence be above the critical temperature.

The gradual changes that occur upon compression of the gaseous and liquid phases before critical conditions are reached should be of interest to production groups because the data presented point to critical pressures above 10,000 pounds for mixtures void of excess intermediate constituents between methane and the high-boiling compounds. For more volatile mixtures, critical pressures may occur in the range of reservoir pressures found in deep wells. It was found in the experimental work that increased concentration of gaseous constituents in the liquid phase may be expected to eliminate the tar constituents of the liquid produced.

A Method for Determining the Water Content of Sands

By H. G. BOTSET,
Gulf Research and Development Co.

A knowledge of the water content of producing sands is becoming of increasing importance to the industry. It is now generally accepted that practically all oil sands contain some free water. Recent experiments have shown that an appreciable fraction of the pore space of a sand may be filled with water while oil production from this sand is water free.

The method described for measuring the water content of sand cores is one developed from those used to determine the water content of alcohols. It is an application of the fact that in the presence of certain organic liquids such as kerosene, carbon tetrachloride, xylol, etc., water and alcohol are only partly miscible. The method does not depend on a temperature effect, but upon the amount of water required to titrate a given volume of liquid. The practical application to oil field cores consists essentially of washing the core with absolute (200 proof) ethyl alcohol and subsequently determining the water content of the alcohol. Since the amount of water to be determined is usually small, it is necessary to standardize the procedure very carefully, and always to use the same amounts of alcohol and carbon tetrachloride, making water the only variable. In determining the water content of cores, the oil must be removed as far as possible by washing with carbon tetrachloride. The amount of carbon tetrachloride left behind in the sand then must be determined by washing with a known quantity of CCl_4 and measuring the effluent wash liquid, the difference being the amount left in the sand grains.

The chief advantages of the method are its speed and inexpensiveness.

Geophysical Possibilities of Soil Analysis

By MITCHELL TUCKER,
Geological Scientific Service Company

Soil analysis has quickly become established as an aid in the search for new oil and gas deposits quite recently although it is not new either in this country or in foreign fields.

The work may be divided into two rough groups (1) ground gas or true gas surveys and (2) actual soil analysis wherein chemical determinations are made on the hydrocarbon vapors of greater molecular weight which are absorbed in surface or near-surface soils. Sampling technique has varied from the one extreme where gas samples were pulled out of the ground with vacuum pumps to the other where earthen samples were taken systematically at the base of seismograph shot holes or core-drilled holes. At present most of the samples taken for gas analysis are from 6 to 10 feet below the surface.

In addition to its application on structural prospects gas analysis offers promise in the search for stratigaphic accumulation of oil and as a tool for marine prospecting along the continental shelves of the world.

Chemical Control of Water in Oil and Gas Wells

By D. G. HEFLEY, H. T. KENNEDY
and P. E. FITZGERALD
Dowell, Inc.

Control of water during drilling and production operations is one of the most serious problems confronting the industry. In rotary drilling the penetration of water-bearing formations generally is of but little consequence because the hydrostatic pressure of the mud column prevents ingress of water. The intermediate water problem is not so simple, however, in wells drilled with cable tools. The most complex, serious and costly phase of the problem however is control of water produced with crude oil.

Chemical methods for the exclusion of water is accomplished through plugging the water producing portions of the formation by chemicals injected into these sections. The area affected is subject to regulation by varying the quality of chemicals used.

Whereas chemicals depended for their plugging action on a reaction taking place in the pores of the formation the present material sets up without the aid of any outside influences. After a controlled length of time the material changes chemically and physically into a hard mass which renders the formation impermeable even at tremendous pressure differentials.

Since the setting of the chemicals in no way depends upon outside influences they may be used in any type of zones.

Chemical Modifications of a Well Treating Fluid

By L. C. MORGAN, LLOYD McKINLEY
and TROY J. STEWART

Acidization to increase oil production has stimulated a wide search for chemical agents to improve efficiency of well-treating fluid. Such research both in the laboratory and in the field has suggested not only modifications of the acid itself but sundry techniques to control the route followed by the acid as it permeates a formation. The result has been great improvements in the process of acid treating wells.

Pipe Line News

Humble Pipe Line Company proposes to cut its rates from New Mexico and most points in Texas

Humble Pipe Line Company has filed application with the Interstate Commerce Commission to reduce its field-gathering and trunk-line tariffs, effective October 26, in New Mexico and most areas in Texas, except the East Texas district. The proposed new rates will be on a par with reductions made May 1 in the same districts by The Texas Pipe Line Company and The Texas-New Mexico Pipe Line Company.

Montana-Canada line sold by Imperial company

Imperial Oil Company, Ltd., has sold its 4-inch pipe line from East Kevin, Montana, to Coutts, Alberta, operated by its subsidiary, Transit & Storage Company, to LaRue Smith and associates, of Great Falls, Montana. Amount of the transaction was not given. The line is 22½ miles long and had 387,000 barrels of storage. Included in the purchase was a gathering system, four 80,000-barrel tanks, one 55,000-barrel tank and a pumping station at the Rice camp in the field.

The line has been idle for a year, the Canadian company having previously curtailed its purchases in the Kevin-Sunburst area with development of the Cut Bank field, and discontinued them entirely with development of the Turner Valley field in Alberta.

Shell and Atlantic reduce Rodessa runs

At the end of current contracts, Shell Petroleum Corporation and Atlantic Refining Company have reduced their purchases of Rodessa crude from United Production Corporation (Union Producing Company) 50%. Shell reduces its purchases to 10,000 barrels, a reduction of 5000 barrels, and Atlantic

reduces its purhcases 2500 barrels to 5000 barrels. The crude sold these two companies by United is delivered at Longview, Texas. United will now run the additional Rodessa crude to storage.

Standard Oil Company of Louisiana, which reduced the price of Rodessa crude last week along with its other crude price reductions, buys 452,000 barrels monthly of Rodessa crude on the Louisiana side and 109,000 barrels monthly from Miller County, Arkansas. It runs no Texas Rodessa crude.

Due to the high severance tax paid, North Louisiana's stripper fields will be the most affected areas under the reduced price schedule. The daily allowable in toto for North Louisiana stripper fields is 20,000 barrels. These fields include Pine Island, Dixie, Bellevue, Bull Bayou; Naborton; Converse, Zwolle; Homer, Haynesville, and Urania.

Build short gasoline line

Wichita Falls, Texas. — Bell Oil & Gas Company, owner of a refinery at Grandfield, Oklahoma, has authorized construction of an 11-mile 4-inch welded line from its plant to terminal site on the Burkburnett-Electra highway, near Burkburnett, Texas. The line will handle mixed grades of gasoline to be marketed in North Texas. The Grandfield plant operates on crude produced and purchased in the Burkburnett district.

Wants Pennsylvania quiz board all legislators

A move to change the personnel of Pennsylvania's oil investigating commission, once declared unconstitutional and recently recreated by the legislature, was launched in the upper house of the legislature last week by Senator E. J. Thompson, a member of the commission. Thompson asked an amendment to a measure already signed by the governor providing a five-man body, all appointed from the legislature.

The amendment would effect dismissal of three layman members of the old commission, who were recently re-appointed by the governor and await ratification by the senate, substituting two additional members from the lower house and another from the senate. The present house member is Representative Michael C. Chervenak.

Layman members of the commission are Judge Ralph H. Smith, Pittsburgh, commission chairman who recently criticized a $20,000 legislative appropriation for carrying on the inquiry as inadequate; John E. McComb, Rouseville, representing producers, and William H. Godfrey, Philadelphia, representing distributors.

A Dauphin County Court decision which found the old commission invalid, as it had been created by a resolution instead of a bill, also criticized the body as not being "truly a legislation commission" as three of its members were appointed by the governor. Senator Thompson declared the $20,000 appropriation would be sufficient to complete the work of the commission, adding that only $3000 in unpaid bills of the old group were outstanding and that the old commission had virtually completed its work before being disbanded.

Association Activities

Nineteenth A. P. I. annual program at Chicago is to be announced soon . . . I. P. A. meets at Tulsa

Plans in preparation for annual meeting of Institute

Plans are being made for the 19th Annual Meeting of the American Petroleum Institute, scheduled for November 14 to 18 next in the Stevens Hotel at Chicago. Announcement of the preliminary program will be made early in October, at which time the advance list of speakers and subjects will be presented.

Outstanding speakers will appear on the program for the two general sessions to be held Wednesday and Thursday afternoon, November 16 and 17. As usual, the first two days of the meeting, Monday and Tuesday, November 14 and 15, will be given over to separate sessions of the Institute's many committees. Group sessions of the Divisions of Production and of Refining will be held Thursday morning, November 17, and Friday morning and afternoon, November 18.

The first meeting of the Institute's Board of Directors is scheduled for Tuesday afternoon, November 15. The Board of Councillors will meet Wednesday morning, November 16, to elect directors, who will be elected at the Wednesday afternoon general session. The annual banquet will be held Thursday night, November 17.

Texas association plans big San Antonio meeting

Rising costs of labor, material and supplies and a constantly increasing tax load, coupled with severely reduced production schedules, present a serious problem to Texas oil operators. Discussions of these and other matters by outstanding speakers will vie with an elaborate program of entertainment for the annual meeting of the Texas Mid-Continent Oil and Gas Association at San Antonio, October 27 and 28.

Heading the list of speakers is Governor-Nominate W. Lee O'Daniel, who will address the Thursday afternoon (October 27) business session, after which a reception honoring him and the visiting oilmen will be given by the San Antonio hosts.

President Charles P. McGaha of Wichita Falls will be the principal speaker at the opening business session Thursday morning. Observations concerning Texas oil developments and their place in the economic life of the state will be discussed by the association head, who has been at work on his speech for some weeks. Committee reports concerning taxation, theft prevention and social security work will also be given at the Thursday business session.

A nationally - prominent speaker, whose name will be announced later, will address the Friday morning business session. The annual golf tournament is scheduled for Friday afternoon with the course of the San Antonio Country Club turned over to the oilmen for play for the W. B. Hamilton trophy and the many other prizes. Already 25 Texas cities have teams entered for the tourney, a handicap affair with prizes for both low and high score players.

State Comptroller George H. Sheppard will address the business session Friday afternoon, discussing the gross production tax. Other important speakers, including public officials, will address the industry's tax men on various phases of federal, state and local taxation.

The principal entertainment event will be the annual dinner Friday night at the St. Anthony Hotel. A floor show of big-time talent will be a feature, while the only speeches of the evening will be award of golf prizes.

A golf tourney also is arranged for the ladies. A luncheon and bridge tea, as well as a tour of the missions and other places in San Antonio are other features planned for the visiting women.

Officers of the Texas Mid-Continent Oil and Gas Association are Charles P. McGaha of Wichita Falls, president; George C. Gibbons of Dallas, executive vice president; Eugene McElvaney of Dallas, treasurer; with the following regional vice presidents: for the Gulf Coast, H. R. Cullen, Houston; East Texas, Bryan W. Payne, Tyler; East Central Texas, H. R. Stroube, Corsicana; North Texas, P. F. Gwynn, Wichita Falls; Panhandle, E. J. Dunigan, Jr., Pampa; West Texas, Harry Adams, Midland; West Central Texas, J. C. Hunter, Abilene; Southwest Texas, Al Buchanan, San Antonio.

East Texas pumping is subject at Kilgore

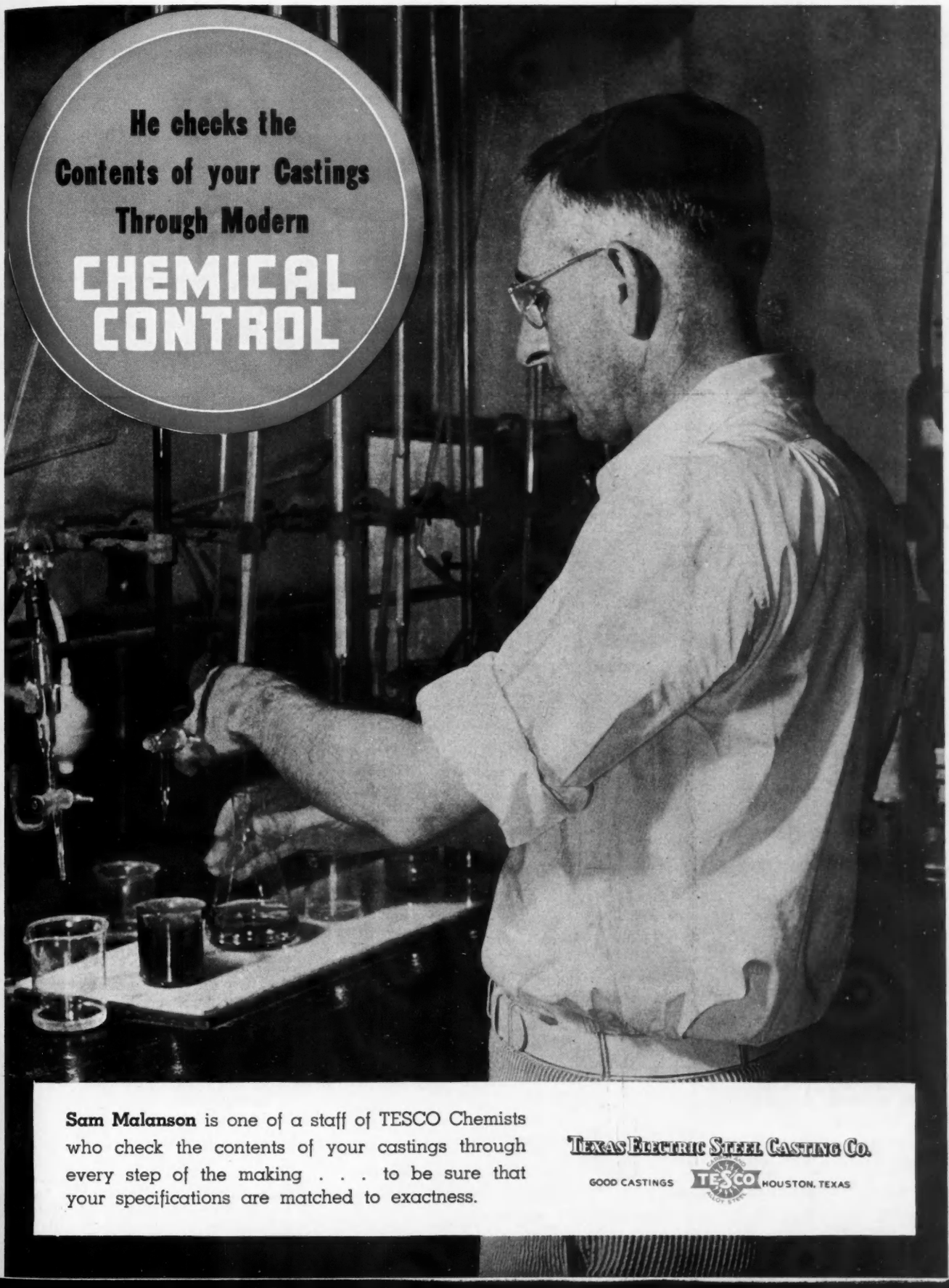
Several men in position to speak with authority on the subject will discuss pumping problems in the East Texas field at the fall meeting of the East Texas chapter of the American Petroleum Institute, division of production, at Kilgore October 11.

R. M. Bass, of the Sinclair Prairie Oil Company, will lead the discussion and attempt to answer all questions that may be asked.

The problem of how the field will be produced after the pressure has declined below the natural flowing stage has commanded wide attention, and this meeting is expected to bring forth some enlightening information on the subject.

Special entertainment has been arranged by a committee consisting of M. W. McVey, independent operator of Kilgore, and R. D. Risser, of the Shell Petroleum Corporation.

The Oil Well Supply Company will



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show its motion picture with sound, entitled "Sucker Rods from Mine to Well."

A dinner will be held at the Kilgore Hotel at 6:15 p.m., and those expecting to attend have been requested to make reservations with the secretary, W. S. Morriss, P. O. Box 56, Kilgore.

I. P. A. announces long and interesting program

The ninth annual meeting of the Independent Petroleum Association of America will be held at Tulsa, October 19 to 21. The annual meeting of the National Stripper Well Association will be held October 18, in connection with association activities.

Live issues scheduled for discussion include: protection of the rights of domestic producers; limiting imports of crude petroleum and refined products; limitation of withdrawals from storage; equitable allocation of the allowable production for each state; ratable takings of oil from all wells within a common source of supply; elimination of unnecessary drilling and unprofitable wells, and other topics affecting the production of oil.

Col. E. O. Thompson, chairman of the Interstate Oil Compact Commission, and Donald Richberg, former chairman of the NRA, will be speakers at the meeting.

The program for the meeting follows:

TUESDAY EVENING, OCTOBER 18

7:00 **Executive Committee Dinner and Meeting.**

WEDNESDAY MORNING, OCTOBER 19
Committee Sessions, Mayo Hotel.

9.30 **Meeting of Membership Committee**
Ralph T. Zook, Chairman,
President Sloan and Zook Company, Bradford, Pennsylvania.

9:30 **Meeting of Sub-Commitee on Unnecessary and Unprofitable Drilling.**
R. A. King, Chairman,
President, King Oil Corporation, Wichita Falls, Texas.

9:30 **Meeting of Domestic Asphalt Committee.**
T. M. Martin, Chairman,
Vice President, Lion Oil Refining Company, El Dorado, Arkansas.

9:30 **Meeting of Committee on Credentials, Rules and Order of Business.**
C. A. Johnson, Chairman,
President, Holly Development Company, Los Angeles, California.

10:30 **Meeting of Committee on Balance of Supply With Demand.**
H. B. Fell, Chairman,
Executive Vice President, Independent Petroleum Assn. of America

10:30 **Meeting of Committee on Elimination of Illegal Production.**
Amos L. Beaty, Chairman,
Amos L. Beaty & Company, Inc., Houston, Texas.

10:30 **Meeting of Constitution and Bylaws Committee.**
John F. O'Donohoe, Chairman,
President, Petroleum Producers Company, Wichita Falls, Texas.

10:30 **Meeting of Public Relations Committee**
Burdette Blue, Chairman,
President, Indian Territory Illuminating Oil Company, Bartlesville, Oklahoma.

WEDNESDAY AFTERNOON, OCTOBER 19

2:00 **Meeting of Nominating Committee.**
E. C. Moriarty, Chairman,
Vice President, Derby Oil Company, Wichita, Kansas.

2:00 **Meeting of Resolutions Committee.**
Wirt Franklin, Chairman,
Franklin Oil Corporation, Ardmore, Oklahoma.

2.00 **Meeting of Activities Committee.**
Winston P. Henry, Chairman,
President, Putnam Oil Company, Houston, Texas.

3:00 **Meeting of Tax Policy Committee.**
E. H. Moore, Chairman,
President, E. H. Moore, Inc., Tulsa, Oklahoma.

3:00 **Meeting of Budget and Finance Committee.**
N. T. Gilbert, Chairman,
General Manager, Midstates Oil Corporation, Tulsa, Oklahoma.

3:00 **Meeting of Royalty Owners Committee.**
James Hailey, Chairman,
President, Mid-Continent Royalty Owners Association, Tulsa, Oklahoma.

5:30 Tea Party.

THURSDAY MORNING, OCTOBER 20

8:00 **Registration, Mezzanine Floor, Mayo Hotel.**

9:00 **General Sessions, Ivory Ballroom, Mezzanine Floor, Mayo Hotel.**

9:00-
9:05 **Invocation.**
Reverend C. W. Kerr,
Pastor, First Presbyterian Church, Tulsa, Oklahoma.

9:05-
9:15 **Address of Welcome.**
Dr. T. A. Penney, Mayor, City of Tulsa.

9:15-
9:45 **President's Annual Address.**
Chas. F. Roeser, President,
Independent Petroleum Association of America, Fort Worth, Texas.

9:45-
10:00 **Report of Committee on Credentials, Rules, and Order of Business.**
C. A. Johnson, Chairman,
President, Holly Development Company, Los Angeles, California.

10:00-
10:20 **Annual Report "Cooperation and Stabilization.**
H. B. Fell, Executive Vice President, Independent Petroleum Association of America, Ardmore, Oklahoma.

10:20 **Report of Tax Policy Committee.**
E. H. Moore, Chairman,
President, E. H. Moore, Inc., Tulsa, Oklahoma.
Discussion.
Report of Committee on Elimination of Illegal Production.
Judge Amos L. Beaty, Chairman,
Amos L. Beaty & Company, Inc., Houston, Texas.
Discussion.
Report of Domestic Asphalt Committee
T. M. Martin, Chairman,
Vice President, Lion Oil Refining Company, El Dorado, Arkansas.
Discussion.
Report of Activities Committee.
Winston P. Henry, Chairman,
President, Putnam Oil Company, Houston, Texas.
Discussion.

12:30 **Recess.**

12:30-
2:00 **Oil Men's Popular Luncheon, Crystal Ballroom, 16th Floor, Mayo Hotel. Address.**
Col. E. O. Thompson, Austin, Texas, Chairman Interstate Oil Compact Commission.
Orchestra and feature entertainment.

THURSDAY AFTERNOON, OCTOBER 20

2:15-
2:45 **Annual Report.**
Russell B. Brown, General Counsel, Independent Petroleum Association of America, Washington, D. C.

2:45-
3:00 Discussion.

3:00 **Report of Committee on Balance of Supply With Demand.**
H. B. Fell, Chairman,
Executive Vice President, Independent Petroleum Association of America, Ardmore, Oklahoma.
Report of Sub-Committee on Unnecessary and Unprofitable Drilling.
R. A. King, Chairman,
President, King Oil Company, Wichita Falls, Texas.
Address: "The Value of Recent Studies of the Bureau of Mines to the Oil Industry."
R. A. Cattell, Chief Engineer,
Oil and Natural Gas Division United States Bureau of Mines, Washington, D. C.

8:00 p.m. **Indian Cavalcade.**

FRIDAY MORNING, OCTOBER 21
General Session, Ivory Ballroom, Mayo Hotel

9:00 **Report of Public Relations Committee.**
Burdette Blue, Chairman,
President, Indian Territory Illuminating Oil Company, Bartlesville, Oklahoma.
Discussion.
Report of Membership Committee.
Ralph T. Zook, Chairman,
President, Sloan and Zook Company, Bradford, Pennsylvania.
Discussion.
Report of Nominating Committee.
E. C. Moriarty, Chairman,
Vice President, Derby Oil Company, Wichita, Kansas.
Discussion.
Report of Constitutions and Bylaws Committee.
John F. O'Donohoe, Chairman,
President, Petroleum Producers Company, Wichita Falls, Texas.
Report of Resolutions Committee.
Wirt Franklin, Chairman,
Franklin Oil Corporation, Ardmore, Oklahoma.

12:20 Adjournment.

12:30-
2:00 **Oil Men's Popular Luncheon, Crystal Ballroom, Mayo Hotel. Address—"Viewpoint of the Brighter Side."**
H. G. Moock, Vice President,
Plymouth Motor Company, Detroit, Michigan.

FRIDAY AFTERNOON, OCTOBER 21

2:15-
3:30 **Meeting of the Board of Directors. Report of the Budget and Finance Committee.**
N. T. Gilbert, Chairman,
General Manager, Midstates Oil Corporation, Tulsa, Oklahoma.
Election of Officers.

3:30-
4:30 Meeting of the Executive Committee

7:00 p.m. Annual Banquet, Civic Coliseum. **Address.**
Donald R. Richberg,
Washington, D. C.
Orchestra and entertainment.

Markets

[*Continued from page 65*]

oil was cut to $1.09½ cents), as outlined by crude buyers, were over-production in the Allegan district and particularly in Illinois.

Approximately 55 to 65 percent of the crude produced in Michigan is marketed out-state, and about 85 percent of the out-state market is in the Toledo-Chicago refining area. Toledo is the only out-state outlet for Michigan oil directly connected by pipe line (Michigan-Toledo 8-inch, capacity 24,000 to 27,000 barrels daily).

In previous years, Pure Oil Company has been one of the major users of crude oil in the Toledo plant. From 10,000 to 12,000 barrels per day of Michigan crude went into this refinery for months. That company, however, has all but ceased to use Michigan crude at Toledo, and reportedly is making ready to swing entirely away from Michigan crude. Much of the crude produced from Pure Oil Company's reserves in the Michigan Porter-Jasper field and the Sherman field currently is sold to local plants.

To further complicate the Michigan price problem is the fact that Standard Oil Company of Ohio also has large crude reserves and daily commitments under contract from the Illinois district. On the basis of new prices in Michigan, local crude costs approximately $1.24-$1.26 at Toledo. Illinois crude laid down in Toledo is slightly higher, but the fact that it has a more economical high-octane gasoline cut makes it, according to buyers here, more desirable.

The Allegan district currently is producing, under pipe line proration, between 7000 and 9000 barrels per day. All production is from Traverse limestone ranging in depth of 1220 to 1600 feet. The district has a rated potential of 15,000 to 30,000 barrels per day.

The new Freeman field, Clare County, Monroe lime production from 3900 feet, with only 6 wells completed, looms as a major Michigan reserve. Twenty-five rigs are running and 12 new locations have been staked in past 6 days. This field has a rated potential of 11,000 barrels per day and currently

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Complete information and operating data will be sent to you on request.

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is under pipe line proration with approximately 6200 barrels moved daily. Michigan-Toledo Pipe Line Company had 14 miles completed of a 29-mile 8-inch pipe line from the Freeman field to Mt. Pleasant, where it will join into the Toledo 8-inch main line. The line is slated to be tied in not later than October 20.

The Allegan district and the Freeman district are the only two flush districts, under pipe line proration, in Michigan.

Paradoxically, premium oil also exists in Michigan. Due to the pipe line carrier set up in certain fields, premiums from 4 to 9 cents are being paid to obtain adequate oil for certain markets, while on the other hand, the general price drop is attributed to lack of markets and over-production.

Likewise, for over two months, considerable oil has been purchased in the Allegan district at prices ranging from 6 to 12 cents under the posted price. This "hot oil" also was cited as one of the reasons for the cut.

Schuler on gravity scale

Lion Oil Refining Company in meeting Standard Oil Company of Louisiana's new reduced price schedule for South Arkansas oil last week, inaugurated a gravity scale for Schuler, being the same as that announced by Standard for Buckner, Magnolia and Village, three Permian lime oil districts, all in Columbia County. Previously Schuler crude has been bought under one posting.

Crude Production

Decrease of 3025 barrels daily brings U. S. total to 3,233,450 barrels; still below U. S. figure

United States crude oil production decreased further during the week ended October 8, having averaged 3,233,450 barrels daily. That was 3025 barrels a day less than in the previous week.

Reflecting the conservative production during the past several weeks, the industry is apparently well aware of the declining demand for petroleum products and the grave results overproduction may have throughout the country. It is assumed, therefore, that the present output of the wells is low enough to permit additional withdrawals of oil from storage, which is highly desirable.

As compared with the 3,233,450 barrels actual production in the week of October 8, the Bureau of Mines had estimated market demand for 3,366,800 barrels of domestic crude daily during October.

Responsible for the national decrease in production in the past week were declines in California, Oklahoma and Kansas, which offset smaller increases in Texas and Louisiana.

Texas production increased 6700 barrels to 1,234,500 barrels daily, and was 124,500 barrels under the Bureau of Mines recommendation and 40,622 barrels under the state allowable.

California last week averaged 661,100 barrels daily, having had a 1700 barrel decrease, and was 42,100 barrels above its indicated market demand and 46,100 barrels above the state proration program.

Oklahoma's output of 450,400 barrels daily was 46,500 barrels lower than in the previous week and 73,200 barrels lower than the indicated market demand, but 22,400 barrels above the allowable prescribed by the state.

Louisiana showed a 5375 barrel increase, as production jumped to 268,975 barrels daily, which was 20,575 barrels more than the federal allocation and 8505 barrels more than the state allowable.

United States Crude Oil Production

Estimates compiled by THE OIL WEEKLY

DISTRICT OR STATE	Bureau of Mines Recommendation (Daily in Oct.)	State Allowable in Oct.	BARRELS DAILY FOR WEEK ENDED Oct. 8	Oct. 1
TEXAS—				
Texas Panhandle	.....	.....	68,100	66,200
North Texas	.....	.....	71,800	71,300
West Central Texas	.....	.....	28,900	29,100
West Texas	.....	.....	189,900	189,200
East Central Texas	.....	.....	89,800	90,600
East Texas Field	.....	.....	370,400	370,600
South Texas	.....	.....	217,300	214,100
Texas Gulf Coast	.....	.....	201,300	196,700
Total Texas	1,359,000	1,275,122†	1,234,500	1,227,800
CALIFORNIA—				
Long Beach	.....	.....	55,000	56,000
Santa Fe Springs	.....	.....	30,800	30,200
Huntington Beach	.....	.....	31,300	30,200
Dominguez	.....	.....	25,900	25,200
Ventura Avenue	.....	.....	34,500	33,500
Midway-Sunset	.....	.....	49,000	63,400
Kettleman Hills	.....	.....	63,500	63,400
Wilmington	.....	.....	95,300	93,400
Others	.....	.....	275,800	267,500
Total California	619,000	615,000*	661,100	662,800
OKLAHOMA—				
Oklahoma City	.....	.....	99,300	95,175
Seminole Area	.....	.....	102,950	101,800
Fitts	.....	.....	36,525	37,725
Others	.....	.....	211,625	220,350
Total Oklahoma	523,600	428,000	450,400	455,050
LOUISIANA—				
North Louisiana	.....	.....	81,575	73,700
South Louisiana	.....	.....	187,600	189,900
Total Louisiana	248,400	260,470	268,975	263,600

DISTRICT OR STATE	Bureau of Mines Recommendation (Daily in Oct.)	State Allowable in Oct.	BARRELS DAILY FOR WEEK ENDED Oct. 8	Oct. 1
KANSAS—				
Burrton-Haven	.....	.....	9,525	9,475
Russell County	.....	.....	21,475	22,775
Silica	.....	.....	10,875	10,975
Others	.....	.....	112,825	116,150
Total Kansas	163,400	163,400	154,700	159,375
NEW MEXICO	109,200	103,800	105,100	105,900
MICHIGAN	53,900	.....	52,100	53,600
ARKANSAS	54,100	.....	55,325	57,750
MOUNTAIN STATES—				
Wyoming	69,700	.....	54,700	60,200
Montana	13,800	.....	13,250	13,100
Colorado	4,300	.....	3,700	3,500
Total Mountain States	87,800	.....	71,650	76,800
EASTERN STATES—				
Pennsylvania Grade	.....	.....	80,000	79,100
Southern Illinois (New Pools)	.....	.....	53,650	52,450
Illinois-Indiana (Old Pools)	.....	.....	17,050	16,100
Others, Eastern	.....	.....	28,300	27,150
Total Eastern States	148,400	.....	179,600	174,800
Total United States	3,366,800	.....	3,233,450	3,236,475

† Daily average, Saturday and Sunday shut-downs to be continued through October 23rd.
* Recommendation of Central Committee of California Oil Producers.

WEEK'S DRILLING HIGHLIGHTS

Texas, Oklahoma and Kansas completed more wells last week than were started. Texas completions numbered 266 while permits were granted for starting 216. Oklahoma finished 49 and started 47, while Kansas completed 34 and started 28. Total completions for the United States were reported at 577 for the week, bringing the total for the year to 21,666, as against 25,835 at the same time a year ago.

Arkansas

Contract has been let for a test to the Permian lime in Union County, five miles southeast of El Dorado. Schuler production continues to be widened, the field now has 84 wells completed and 22 drilling.

New Mexico

Lea County operators started 14 new tests last week, despite low allowables by state order supplemented by pipe line proration. The lease situation is such that drilling cannot stop.

South Louisiana

Production from new sands is promised in a number of localities, most interesting of which is at Lake Barre, Terrebonne Parish, below 10,000 feet. Whether this well produces or not, it has the record of finding the deepest salt in the neighborhood.

Wyoming

A substantial section of Tensleep sand at Mahoney Dome indicates a good well that will be determined when more tanks are erected. Initial flow of 635 barrels was all that available space would handle.

Michigan

Freeman-Redding development in Clare County was given momentum by deepening what appeared a failure to the north, two miles from the discovery well. A failure, however, dampens hopes toward the east. In Van Buren County's shallow area extension brings near a town-lot drilling campaign.

East Texas

A second distillate well was completed last week in the Lower Trinity on the east flank of the East Texas field, a development that definitely established the presence of an important reservoir of high-pressure gas production that eventually will be utilized for lease operation and repressuring operations. The well is located three miles east of Woodbine production.

California

An extension to the Athens-Rosecrans field was indicated last week, and increased activity in sands below 7000 feet probably will result from latest showings in H. B. Oil Company's Rosecrans 1. The second producing well for the deep Wasco field should be completed this week, Continental's KCL A-3, due north of the discovery well being ready to complete at 13,644 feet. An open-hole test will be made.

Oklahoma

The Garfield County wildcat, which early last week gave promise of opening a new field, dropped into the doubtful class when it started making water. At the close of the week Champlin Refining Company had crews striving to determine the source of the water. A more favorable turn of events was taken during the week by an Oklahoma County well, Orphanage 1, which began making oil and gas from either the Simpson or dolomite or the first Wilcox sand.

West Texas

Promise of production from the Delaware horizon in the extreme north end of Reeves County was a feature of operations in this district during the past week. A well yielded sweet gas from a sand section at 3290 feet and gave impetus to leasing operations over a wide area.

North Texas

Completion of a semi-wildcat in central Young County encouraged deep lime prospecting in parts of North Texas. The well was located three miles southeast of New Castle and flowed 86 barrels of oil in an hour through a medium choke. The district is regarded as favorable for operation by independents.

Comparison of Permits Granted for New Wells

STATE	Week Ending Oct. 8	Total this Mo.	Total this Year	Total this Date Last Year	1937 Year Total
Arkansas	5	5	193	194	240
California	17	17	957	1,220	1,584
Louisiana	42	42	1,007	997	1,227
Kansas	28	28	1,228	2,178	2,663
Michigan	24	24	715	773	958
Oklahoma	47	47	1,605	2,235	2,711
Texas	216	216	10,296	14,181	17,238
Total	379	379	16,001	21,778	26,621

Summary of Wells Completed in the United States Week Ending October 8, 1938

	Completions	Oil Wells	Gas Wells	Failures	Initial Production	Total, 1938	Total this Date, 1937
Alabama	.....	.....	.....	.....	.....	2	1
Arkansas	3	3	.....	.....	2,423	174	92
California	21	17	.....	4	12,085	989	1,176
Colorado	.....	.....	.....	.....	.....	6	15
Florida	.....	.....	.....	.....	.....	.....	1
Georgia	.....	.....	.....	.....	.....	1	.....
Illinois	33	24	.....	9	8,684	1,109	211
Indiana	.....	.....	.....	.....	.....	96	105
Kansas	34	27	.....	7	44 080	1.335	2.076
Kentucky	17	11	.....	6	2,047	609	337
Louisiana	32	16	5	11	5,255	859	759
Michigan	29	14	.....	15	4,183	722	740
Mississippi	1	.....	1	.....	.....	12	11
Montana	.....	.....	.....	.....	.....	57	155
Nebraska	.....	.....	.....	.....	.....	1	.....
New Mexico	10	10	.....	.....	3,733	419	557
New York	*9	9	.....	.....	38	*520	*1,000
North Dakota	.....	.....	.....	.....	.....	1	.....
Ohio	23	5	10	8	107	757	1,174
Oklahoma	49	33	2	14	9,317	1,712	2,372
Pennsylvania	*32	28	1	3	33	*1,655	*2,355
Tennessee	.....	.....	.....	.....	.....	2	.....
Texas	266	184	11	71	199,079	9,999	11,898
Utah	.....	.....	.....	.....	.....	3	.....
West Virginia	16	2	14	.....	20	544	714
Wyoming	2	1	.....	1	110	82	86
Total this week	577	384	44	149	291,194	21,666	25,835
Total last week	536	377	45	114	259,082	.....	.....
Total this year	21,666	15,006	1,538	5,122	14,044,338	.....	.....

* Includes water-intake and pressure wells.

Oklahoma Fields

Garfield strike begins failing shortly after discovery. Oklahoma wildcat shows from undetermined formation.

Tulsa.—After two days of flow through casing the Garfield County wildcat, credited with opening the Hillsdale pool, northwestern Oklahoma, a week previous, dropped into the doubtful class when it began making water and the pressure dropped to a point that gave output only by heads. At the close of last week Champlin Refining Company had crews striving to determine source of the water in Boehm 1, SW SW NE 4-24n-8w, which will be plugged back. First conclusions were that the oil was coming from the dolomite section between 6680 and 6690 feet, rather than from the second Wilcox sand, top 6692, total depth 6703 feet.

With this turn of events for one wildcat, an Oklahoma County well, Orphanage 1, SE SW NW, began making oil and gas from either the Simpson dolomite or the first Wilcox sand. It is at 6702 feet in a break between the first and second Wilcox members. While bailing, gas continued to come through the mud and each bailer brought small amounts of oil without water. The well is north of Britton townsite on a tract owned by an orphanage of the Methodist Church.

Among the wildcat failures for the week was a Garfield County test which was given up in second Wilcox sand at 6950 feet. In the southern part of the state the Coal County wildcat of Carter Oil Company and associates quit at 7374 feet in the Wilcox sand.

The state had 56 completions, 6 being abandoned locations and one gas input well. The 33 oil wells in the list had total initial output of only 9317 barrels. Only 47 wells were started.

Decision to plug back Boehm 1 came after it began making salt water and flowing only by heads with gas volume down to an estimated 1,000,000 cubic feet daily. When opened October 7 the flow was 55 barrels in 25 minutes through casing. In its first two hours on half-hour gauges it flowed, 21, 22, 13 and 18 barrels for each period. The oil tested 40.7 at 70° F. Gas output over this period was estimated at 15,000,000 cubic feet. Performance for the first day of testing was such that the well earned a rating of 40 barrels an hour. By the second day, however, gas volume dropped and the well ceased its steady flow. Toward the end of the day the heads were 1½ and 2 hours apart and gas volume was down to an estimated 1,000,000 cubic feet daily. Several grind out tests were made during the second day and water content as high as 6 percent was found.

First decision of officials of the production department of Champlin Refining Company was to run tubing and continue further testing of the second Wilcox sand, whose corrected top is now given as 6692 feet, total depth 6702 feet. Later it was decided to plug back. It is likely that the full second Wilcox section will be cemented off and testing continued of the dolomite section.

While drilling the well had gas showings in the dolomite between 6680 and 6690 feet. It was not until a core was taken at the total depth that the well made its first blowout September 29. By the next day it had cleaned itself and the rotary rig was moved out, after Christmas tree had ben installed. Pressure on the casing built up to 2275 pounds and remained steady at that figure until testing began a week later. Action of the well in its first head flows plus its ability to clean itself were accepted as evidence that both oil and gas were coming from the second Wilcox as well as gas from the bromide. Plugging back is being adopted on the possibility that the source of both oil and gas is the bromide, which is only a sporadic carrier of oil in several fields, one being Oklahoma City.

This turn in development halted a lease and royalty play that had grown steadily during the week the well was shut in for tankage and testing. All buying was outside of Section 4-25n-8w, which is held solid by Champlin Refining Company.

Garfield County Failure

The week also brought abandonment of a Garfield County wildcat, as Indian Territory Illuminating Oil Company finished testing Kitchin 1, C SE SE 17-22n-5w, at 6950 feet in the second Wilcox sand, which was dry in all cores. This well had top of the Hunton lime at 6661 feet, top of the Sylvan shale at 6680 feet, top of the Viola lime at 6782 feet, top of the Simpson dense at 6815 feet, top of the first Wilcox at 6878 feet and base of this member at 6890 feet.

Other than the Oklahoma County wildcat north of Britton, only one other wildcat was left in Northern Oklahoma with a depth sufficient to carry early hope of completion. This is the Noble County test of R. H. Hollenback and associates, Mathews 1, C SW NW 8-20n-1e, where drilling has been resumed with the hole around 4900 feet.

In Kay County Tide Water Associated Oil Company is below 1000 feet in Hockman 1, NW NW NE 19-28n-1e, a test to go to the Wilcox sand on the flank of the old Dilworth field, which is a producer of both oil and gas. In Logan County, Continental Oil Company is rigging up a wildcat test, Donahoe 1, NW SW 16-18n-2w, also a Wilcox test.

Two Cleveland County wildcats are at depths which indicate that they will reach Wilcox sand this month. Gulf Oil Corporation is below 5600 feet in Taylor 1, SE SE SW 1-7n-2w. Big Chief Drilling Company and associates are below 4900 feet in Straeteger 1, NW NW SW 25-9n-2w. Both these wells are north of the second Wilcox sand producer, which is listed as a pool opener for the Noble field although the test has been making water since its completion last May and no offset wells have been started.

In the Cement pool, Caddo County, Ohio Oil Company last week got a Rowe sand producer in Lackey 6, SE NW 11-5n-9w, good for initial of 1815 barrels between 3316 and 3360 feet, total depth 3366 feet.

The community test being drilled by Carter Oil Company's Smith 1, C SE SW 26-5n-8w, in the old Chickasha gas field, is drilling below 4000 feet. Holders of the community block have rights below 3500 feet and the test is due to go to 10,000 feet. It had a small show of gas and oil between 3303 and 3316 feet.

Farther west in Caddo County, The Texas Company has regained circulation in Smith 1, C NE NW 25-5n-12w. It had a gas blowout between 2418 and 2422 feet and circulation was lost. Heavier mud had to be used to regain circulation.

Still farther west, Continental Oil Company is below 6900 feet in the Washita County wildcat, Proctor 1, C NW 28-10n-20w, a test being drilled on a block of 31,000 acres. Scant information is available on this well.

Abandonment of the Coal County wildcat, drilled by Carter Oil Company and associates, Mote 1, C E½ SW NW 19-2n-9e, leaves the Centrahoma structure with its excellent closure and further evidence that it does not hold oil. It went to 7374 feet in second Wilcox sand, which was cored. The final activity was an electrical logging test. It had shows of both oil and gas at several higher levels but not of sufficient amount to make commercial production. Its log showed top of the Hunton lime at 6191 feet, top of the Sylvan shale at 6481 feet, top of the Viola lime at 6604 feet, top of the bromide at 6825 feet, top of the Simpson dense at 7205 feet, second Wilcox at 7340 feet and a core from that depth to 7355 feet carried oil and gas in small quantities. Second Wilcox was dry.

This is the third failure for the Centrahoma structure, which came into favor in 1935, following discovery of the Fitts and Jesse pools to the northwest.

Deepen Hughes Test

After plugging back several times in an effort to get higher output and reduce water in Beeker 1, Hughes County wildcat NE NW SW 8-5s-10e, Phillips Petroleum Company has decided to drill deeper from the last plug-back depth, 5632 feet. This test went to 6283 feet, where it made oil and water. For several months it has been plugged back and put on the pump as well as agitated with gas. Small production and water content have been recovered frequently.

In the Seminole area proper, George L. Pace is drilling and coring in Riley 1, NE NE SE 2-9n-3e, Pottawatomie County, after recovering a stained core in the first Wilcox sand between 5330 and 5337 feet. It is now below 5350 feet.

Another Pottawatomie County wildcat is setting casing at 4310 feet after testing the Simpson dolomite by electrical logging. It is being drilled by Hall & Briscoe, Merkle 1, NW SE NW 35-5n-8e.

Failure to get saturation in the Wilcox sand between 4202 and 4283 feet brought a shut-down order for the Seminole County wildcat of the Cooper Drilling Company, Samuel 1, NW SE NE 19-6n-8e, south of the Sasakwa field.

A second well for the strike west of the Little River field was indicated when oil rose 3000 feet in the hole in J. F. Smith's Smith 1, NW NE NE 20-7n-6e, from 4330 feet in the Wilcox sand. The first well Edgeman 1, SEc 17-7n-6e, made a pumping producer from the Wilcox sand. The pool has been designated Newsome.

Drilling is to be resumed in a Pittsburg

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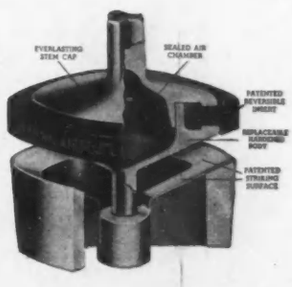

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OKLAHOMA
Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
Carter—		
Carter Oil Co., Feagin 1, c nw sw 36-2s-3w (pb 6100 ft)	*	8025
McGraw Oil Co., Stewart-Hawks 26, nw ne nw ne 4-4s-3w	22	1108
Shell, Horton 24, nw ne nw se 6-4s-3w	16	1182
Creek—		
Kemp & Gibson, Sellars 1, sw nw sw 30-17n-7e	¶2	1670
Big 4 Pet. Co., Grayson 1, swc se 13-19n-7e	24	2661
Strozier, Gidney 3, se nwc se 12-16n-11e	200	2301
Garvin—		
Magnolia Pet. Co., Cowan 2, nw nwc sw 15-1n-3w	*	2073
Jefferson—		
Bridwell Oil Co., Seay Estate 5-D, sw sw nw ne 30-6s-5w (pb 1899 ft)	10	1904
Lincoln—		
Mudge Oil Co., Maddox 1, se ne se 9-14n-6e	70	3170
Helmerich & Payne, Fitch 8, ne se ne 15-14n-6e	147	3091
Wilcox O&G Co., Fitch 5, sw ne ne 15-14n-6e	45	3001
Marshall—		
Neff et al, Talliferro 1, ne ne nw se 14-5s-5e	*	633
Muskogee—		
Garrett, Fuel 1, sw swc 22-14n-18e	*	1675
Parks, Hilderbrand 3, sw sw ne se 17-14n-19e	¶1.5	596
Okfuskee—		
Shell, Gaghagan 1, c ne nw 11-11n-8e (otd 3895 ft)	55	3915
Staples, Robinson 2, se ne se 21-12n-11e	35	2210
Oklahoma—		
I. T. I. O., Bodine 4, ne nw nw 30-11n-2w	*	3200
Okmulgee—		
Okla. Oil Corp., Jefferson 1A, se se sw ne 7-14n-11e	*	3070
Kedkuk, Bosen 6, c n½ ne ne 36-14n-12e	12	1957
King, Beaver 1A, se se ne nw 6-14n-13e	*	2682
Lynch, Thomas 10, nw nw se nw 30-14n-14e	5	1338
Burns, Anderson 1A, ne nec sw 35-14n-14e	*	1191
Osage—		
Johnson O&R Co., 21, nw nwc se 30-21n-9e (input well)		334
Trinity Oil Co., 1, se ne se se 15-22n-10e	*	2021
Harland Oil Co., 22, nw nwc 25-24n-11e (otd 1687 ft)	5	1707
Pawnee—		
Coronado O&G Co., School Land 21, nwc sw 16-21n-8e	25	2200
Sinclair Prairie Oil Co., Burger "B" 6, nec se 17-21n-8e (otd 1843 ft)	44	2176
Pontotoc—		
Continental Oil Co., House 4, se ne se 12-1n-7e	3699	4668
Sinclair Prairie Oil Co., McCarty 4, nwc ne 22-2n-7e (pb 1357 ft)	40	4029
Arrowhead, Juluis 1A, nw sw nw ne 6-4n-7e	10	1180
Sunray Oil Co., Shields 4, sw se nw 33-5n-8e (pb 2185 ft)	30	2597
Pottawatomie—		
Denver P. & R. Co., Richards 1, sw ne ne 2-6n-4e	70	4092
Magnolia Pet. Co., Nicklas 5, nw ne nw 31-7n-5e	260	4197
J. E. Trigg, Rhodd 1, ne se se 32-7n-5e	950	4118
Vanselous 3, se ne se 32-7n-5e	619	4077
Big Chief Drlg. Co., Canfield 1, nw sw sw 33-7n-5e	194	4101
Hall & Brisco, Coleman 3, ne nw nw 33-7n-5e	360	4127
Summit Drlg. Co., Good 1, nwc sw 4-11n-5e	*	4975
Seminole—		
Magnolia Pet. Co., Fleet-Osborn 5, nec se 26-5n-7e	170	2301
Reed 7, swc nw 17-5n-8e (pb 2302 ft)	*	2814
Hall, Troup & Moore, Shirley 1, se sw nw se 27-6n-5e	80	2714
Sinclair Prairie Oil Co., Sharver 1, se nw sw 15-6n-6e (pb 3517 ft)	110	3588
Cooper Drlg. Co., Samuel 1, nw se ne 19-6n-8e	*	4259
Cities Service Oil Co., Fish "B" 2, sw se se 19-7n-8e (otd 3036 ft)	525	4163
Minnahoma Oil Co., Neal 2, nwc 7-8n-6e (pb 4378 ft)	60	4609
Carter Oil Co., Riddle 5, cwl nec se 35-11n-6e (otd 4041 ft)	1380	4117
Stephens—		
Louis Sikes, Furst 8, se se ne nw 16-1s-8w	*	2154
Louis Sikes, Mulkey 9, sw sw nw ne 16-1s-8w	40	2127
Tulsa—		
Pepis, Harrison 2A, sw sw ne se 15-18n-12e	*	1935
Hardesty et al, Clinton 1A, se sec sw 23-19n-12e	5	485

*Failures; †Junked; ‖Million cu. ft. gas.

County wildcat long shut down at 1300 feet, where Supreme Oil Company reached that depth in Stevenson 1, SW SW SE 19-3n-4e. Rotary tools are being moved in.

Two offsets are to be drilled to the single producer in the Meridian pool, Logan County, which was opened in May of this year by Sinclair Prairie Oil Company, Crews 1, SW SW NE 27-16n-1e. Helmerich & Payne and Wood Oil Company have taken farm-out from Standard Oil Company of Kansas and will drill Humphrey 1, NE NW SW 27-16n-1e, a southwest diagonal offset to the producer. Helmerich & Payne will drill Watson 1, NW NW SE 27-16n-1e, a south offset to the discovery well, on acreage farmed out by Mid-Continent Petroleum Corporation. Gulf Oil Corporation has had location staked for Henderson 1, SE SE NW 27-16n-1e, a west offset, for several weeks but no work has been done.

The lone producer in the area was completed July 12 for 357 barrels from second Wilcox sand, total depth 5220 feet, after plugging back from 5238 feet. It began making oil in May. Oil is being shipped by tank car.

Another failure for the deep area in the Fox-Milroy sector, Carter and Stephens counties was marked up last week when Carter Oil Company failed to get production in the Hunton lime after plugging back from the oolitic lime in Feagin 1, C NW SW 3-2s-2w, Carter County. Its last plugged-back depth was 4988 feet. It tested the deeper lime over a long period. Several perforations and acid loads were used in the Hunton section without success.

Only one of the deep wells is now testing the deep oolitic member, source of oil in four wells now producing. Lester 1, C NW NW 25-3s-3w, is at 8142 feet, where it will be shot. Three other wells are drilling.

Kansas Field Developments

Stafford County hole plugged back to open new field.

Rice County well may be new pool or Habiger extension.

Wichita.—One new pool for Stafford County came out of field development in Kansas last week. Drilled by Atlantic Refining Company, Wise 1, NWc 13-24n-14w, indicated production a month ago in the Kansas City-Lansing lime section but was carried down to the Arbuckle lime, where it was dry. Plugged back to the Kansas City lime, casing was perforated with 60 shots from 3812 to 3871 feet and the pay was treated with 700 gallons of acid. On potential test late in the week the discovery pumped 1494 barrels with no water showing. The new strike is on the Stafford County nosing into the Dodge City basin from the Central Kansas uplift. Nearest production is in St. John pool, five miles southeast.

Either a new pool or an extension of the Habiger-Stumps pool, Rice County, came with a flow of 186 barrels in Habiger 1, C SW SW NE 9-18-10w. It is an offset to Lansing lime production but a mile south of other Arbuckle lime production.

Results of the week showed more wells completed than started in Kansas, whose 27 oil wells, out of 35 completions, had total initial output of 44,080 barrels. In large measure this was the result of a potential of 10,000 for the Zenith pool well of E. H. Moore, Inc. O'Haver 4, SE SW SW 13-24-11w. A recent change in potential methods for the pool has brought several high figures and the Kansas Corporation Commission has called a hearing to give consideration to a change in method.

The state had 28 wells started during the week. Among them were four wildcats in the western area.

Atlantic Refining Company's Wise 1, drilled to the Arbuckle lime, total depth 4193 feet, which was dry. Arbuckle was plugged off and testing began through perforations previously made. In 16 hours of flowing it made 643 barrels, with 5 hours of the test through casing and 11 hours through tubing. The oil tested 41 gravity.

In September this well had its first showing from the upper limes between 3647 and 3656 feet, where it had oil with an estimated 6,000,000 cubic feet of gas. This was killed and the hole carried deeper, where it had another oil showing at 3822 feet, with 7-inch casing set at 3787 feet. Drilling between the two showings was by cable tools. Rotary tools were moved back in and the hole carried to the Arbuckle lime. When this proved dry it was plugged back to the bottom of the casing.

On a second potential test the Barber County Arbuckle lime wildcat of Pryor & Lockhart, Grant 1-C, NEc 17-31-13w, established potential of 2474 barrels, after getting a first potential of 1211 barrels. The second test was the calculation after allowing the well to flow steadily for 8 hours, whereas the first test was by two 4-hour tests. This well had a showing in the Wilcox sand last summer and efforts were made to get commercial production there. Finally it was carried to the Arbuckle lime, total depth 4611 feet, where it has been testing over several days. It is less than a half mile from a Viola lime producer in the Lake City field but because of gaining production from the Arbuckle lime is classed as a pool opener, being the first Arbuckle lime well in the county. Sinclair Prairie Oil Company is scheduled to drill a northeast diagonal offset, Gant 1, SWc 8-31-13w.

Either an extension of a mile to the south or a new pool for Rice County seemed assured from preliminary tests by Transwestern Oil Company, whose Habiger 1, C SW SW NE 9-18-10w, flowed 186 barrels on potential test from Arbuckle lime top 3254, total depth 3269 feet. The well is a north offset to a Lansing lime producer but is the only Arbuckle lime production in the area. It is a mile south of the Stumps-Habiger pool, which produces from both limes.

Among the wildcats started during

the week were: J. E. Shaffer, Inc., Barrett 1, SWc NW 36-16-14w, Barton County, 3½ miles west of the Ainsworth pool and south of the Trapp pool;

Earl King, fee 1, NEc 22-31-4e, Cowley County, northeast of the Hittle pool;

Skelly Oil Company, Moore 2, C S L SW 2-27-11w, Pratt County, southwest of the Cunningham pool;

W. M. McNabb, Fritz 1, SW SE NW 4-12-14e, Shawnee County, in the eastern part of the state.

An outpost wildcat in Stafford County, Elliott 1, SW SW NE 26-27-14w, was abandoned by Champlin Refining Company at 4857 feet in the Arbuckle lime.

KANSAS

Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
Barton—		
I. T. I. O. Co., Hoffman "B" 1, cwl sw se nw 7-16s-13w	1829	3348
Western Kans. O. & R. Co., Reiff 1, swc se 35-16s-13w	251	3340
Shell, Hoffman "C" 4, csl sw ne se 1-16s-14w	1981	3344
Stanolind O&G Co., F. Panning 16, c s½ s½ ne 2-20s-11w	2645	3284
G. Stuekemann 5, ne se se 11-20s-11w	1668	3281
Butler—		
Rex & Morris, Framer 1, ne sw nw 8-28s-7e	40	2672
Pryor & Lockhart et al, Lietzke 1, ne sw nw 24-28s-7e (pb 2767 ft)	50	2770
Coffey—		
Kilby, Crandell 1, swc 15-23s-15e	*	1543
Cowley—		
Phillips Pet. Co., Newton 2, sw se sw nw 15-30s-4e	222	2796
Phelps & Spencer, Dunbar 1A, se ne ne sw 29-30s-5e	658	2265
McKnabb & B. B. Blair, Hittle 1, sw sw se ne 21-31s-4e (otd 3284 ft)	1643	3288
Earl Wakefield, Wilson 5A, sw ne nw 4-32s-3e	3002	3270
Ellis—		
Darby Pet. Co., Jorgenson 1, sw nw sw 7-11s-17w	2500	3341
Jorgenson 2, nec sw 7-11s-17w	2500	3442
Shell, Rumsey 11, ne nw se nw 23-11s-17w	3238	3388
Ellsworth—		
Phillips Pet. Co., Horejsi 1, sec ne 17-16s-10w	164	3380
Patzner 7, sw nw nw 30-17s-10w	1089	3315
Graham—		
Duwe & Ferris, Parker 1, c se sw 29-6s-23w	*	4202
Greenwood—		
Shaffer & Howell, Schneider 13, sw nw sw nw 15-23s-13e	25	1581
Aikman & Braden, Taylor 1, nec nw 15-24s-12e	*	1803
Pratt—		
Champlin Ref. Co., Elliott 1, swc ne 26-27s-14w	*	4857
Rice—		
Continental Oil Co. et al, Williams 3, ne se nw 13-18s-8w	2489	3223
Transwestern Oil Co., Moran 6, nwc 4-18s-10w	299	3268
E. V. Holland, Reese "A" 1, nwc 5-19s-9w	*	3248
Skiles, Campbell 1, sec ne 28-19s-9w (otd 3210 ft)	905	3221
Watchorn Oil Co., Caldwell 1, ne se ne 29-20s-9w (pb 3248 ft)	*	3290
Rooks—		
Broadview Oil Co., Livengood 1, sec nw 11-9s-16w	15	3250
Russell—		
J. J. Hall, Miller 4, swc se 30-14s-13w (pb 2980 ft)	708	3163
Stafford—		
Stanolind O&G Co., Hayes 3, se sw se 11-24s-11w	2019	3777
J. E. Crosbie, Johnson 2, nwc sw 13-24s-11w	994	3790
E. H. Moore, Inc., O'Haver 4, se sw sw 13-24s-11w	10,000	3810
Jack Robertson, Townsite 2, nw ne se se 14-24s-11w	2523	3805
Stanolind O&G Co. et al, Volker 4, nec 23-24s-11w (pb 3802 ft)	603	3818
Woodson—		
M. J. Trott, Abbott 1, nw ne ne 21-25s-14e	*	1519

*Failures; †Junked; ¶Million cu. ft. gas.

California Fields

Athens-Rosecrans extension indicated by core showing. Northern California wildcat showing oil possibilities.

Los Angeles.—An extension to the Athens-Rosecrans field is expected to be developed this week following showings cored by H. B. Oil Company's Rosecrans 1, southwest corner of Figueroa Street and Rosecrans Boulevard. O'Dea sand was reported around 7300 feet and again below 7800 feet. Seven-inch casing has been set preparatory to a production test.

Bankline Oil Company's Kirby 1 along the southeast trend of the field failed to pick up sufficient sand. The hole may have been crooked and has been plugged back to redrill. Kirby 1 prospected to 7653 feet, picked up small showings of the O'Dea at 7290 feet. Union Oil Company's Rosecans 25, southeast of Broadway and Rosecrans, is good for approximately 1000 barrels of 31.2 gravity oil per day from 7438 feet.

Another Los Angeles Basin dud is expected to be the much discussed John McKeon Carmenita 1 wildcat that sought a so-called "hidden pool" east of the town of Norwalk. Bottoming at 8350 feet, with a few scattered showings in evidence between 7475 and 8350 feet, Carmenita 1 was subjected to a series of tests but proved wet. Work is suspended.

Semi-official reports are to the effect that faint showings of oil and gas have been encountered in Arnold 1, wildcat that is prospecting a block of 16,000 acres in Madera County, Northern California. Barnhart-Morrow Consolidated Oil Company started this test in Section 22-10-17 and it has reached 2400 feet with the expectation that it will continue until enough zone is cored to justify a production test.

Near Lost Hills, Kern County, California Land Company's Occidental 1, Section 24-26-20, has cored the upper Temblor from 5937 to 5985 feet and also encountered some fair looking sand between 6014 and 6074 feet. Coring is below 6300 feet and the operator intends to continue until something better is penetrated.

The Wasco field, northwest of Bakersfield, will not be a one-well field much longer. Continental Oil Company's KCL A-3, due north of its discovery well bottomed at 13,644 feet and five-inch landed to 13,211 feet. An open hole productoin test was slated during the past week, but it may be a week before anything conclusive is known. The second venture is lower structurally, but if it comes in successfully will set a new record for deep producing wells. Directly west of the discovery well, Standard Oil Company's Mushrush 1 is drilling below 12,250 feet and it probably will be the next completion following, although the Continental Oil Company's KCL 8-B-1 due south is standing with 7-inch casing cemented at 13,000 feet, with bottom at 13,054 feet.

Another Standard Oil Company well slated for early completion is No. 82-13-C, situated at Coalinga Nose. It is coring below 6850 feet, having topped the Gatchel zone around 6770 feet. This test is due west of the discovery well in the field. Nearby, Tide Water Associated Oil Company's Guardian 66 is yet to encounter the Gatchell sand and is coring below 6900 feet in dark gray shale. The operator's Fleishacker 57-1, northerly from the proven field, is coring below 5400 feet.

Continental Oil Company recorded another excellent completion in San Miguelito field, Ventura County, by bringing in Grubb 9, Section 23-3-24, for an initial yield of 2200 barrels of 32 gravity oil per day from a depth of 7000 feet.

In the San Pedro area, Superior Oil Company is preparing to drill a series of core holes. Its first venture will go down 1000 feet northeast of Hogan Petroleum Company's Burkhardt 1, in Section 7-5-13, on the west side of San Pedro Boulevard and near the yards of the San Pedro Lumber Company. Hogan Petroleum's Burkhardt is coring below 3800 feet in shale without showings. Production is being sought along the north side of the fault.

Within the city limits of Santa Monica, The Texas Company has finally spudded Spring 1, near the intersection of Penmar and Morningside Bay. The company controls around 500 acres and is offset by independent groups who are awaiting results of this test.

CALIFORNIA

Completions

Company, Well and Location	Init. Bbls. Prod.	Depth
Montebello—		
St. Helens Pet. Co., Monterey 28	179	6290
V-8 Oil Co., M. B. 1	350	6408
Torrance—		
Del Amo Oil Co., Denbo 1	125	4896
Pacific Western, Marble 4	64	4986
Standard, Marble 2-7	450	4980
Louisiana Oil, Lord 1	*	4375
Wilmington—		
Bankline, U. P. 11	200	2945
Union Pacific, UP (LB) 91	484	4042
Canal—		
Ohio, KCL E-8	1850	8292
Kern River—		
L. G. Helm, No. 8-A	15	670
Mount Poso—		
Ring Oil Co., Bowles 7	250	1740
Rio Bravo—		
General, Wagner 4	4000	11510
Ten Section—		
Shell, KCL B-67-20	80	8374
South Mountain—		
Texas Co., Richardson 5	375	6702
Santa Maria Valley—		
R. R. Bush, Bradley Lands 3	600	5391
Union, Security 2	483	4682
Vicente 4	550	5153
Ventura Avenue—		
Tide Water Associated, Lloyd 127	2030	9900
Newhall—		
National Petroleum, No. 1	*	2775
Richfield—		
Shell, Kiker 1	*	3023
Ojai—		
Holly Dev. Co., Macrate 1	*	4786

*Failures; †Junked; ¶Million cu. ft. gas.

West Texas Fields

Show encourages Delaware, Reeves County, development. Big producer being completed in Jordan, Crane County.

San Angelo, Texas.—Development of production from the Delaware horizon in the extreme north end of Reeves County gained encouragement when Frankley & Rice's W. A. Tunstill 1, NE NE NW T&P Section 10, Block 56, Township 2, yielded 1,500,000 feet of sweet gas from sand section at 3290-99 feet. It is 4 miles northeast of Orla, and north by west of General Crude Oil Company's failure drilled to 3590 feet, August, 1937, after passing up small volume of free oil with water following shot in pay at 3288-94 feet. Tunstill 1 is 112 feet higher on structure than the dry hole, having logged top of lime at 3254 feet, and sand at 3283 feet, with an elevation of 2906 feet. Owners plan to run pipe before drilling deeper to try for oil production.

Crane County sector of the Jordan field, which centers largely upon University Lands, was credited with a big well in process of completion when The Texas Company's University 3-D, NE SE NE Section 13, Block 35, flowed 82 barrels natural the first hour and 138 barrels on the fourth hour through casing from lime at 3540-55 feet. It has an elevation of 2805 feet, and is the third big well for the 160-acre lease. Several virtually proved 160-acre tracts in this field are to be sold by auction by the University when the next sale is held. Another outpost for the Crane County pool on University Lands between the Church & Fields and Gulf-Waddell areas has been assured by the starting of operations on Standard Oil Company of Texas' University-Tex 1, SW SE NE Section 6, Block 30. Magnolia Petroleum Company's University 1-6, offsetting production, was drilling at 3120 feet. Three completions to date are small pumpers, but a large producing area apparently prevails.

The Texas Company's University 1-H, NW NE SE Section 4, Block 14, wildcat for the Shafter Lake area, Andrews County, blew out and tested 4,000,000 feet of dry gas in sand at 2942-52 feet, and was drilling at 3800 feet. Top of Yates was called at 2790 feet, with an elevation of 3165 feet. Humble Oil & Refining Company's University 1-G, C NW NW Section 18, Block 14, southeast outpost for the Means field, failed to show for a producer in progressing to 4940 feet or about 400 feet below the normal oil level.

Atlantic Refining Company et al's Parker Bros. 1, C SE NE W. T. Section 264, Block G, 2½ miles northwest of the Seminole pool, Gaines County, and 2 miles south by west of a producer, was drilling at 4965 feet. Top of Yates was called at 3255 feet, with an elevation of 3348 feet, and dry gas was logged at 3315-35 feet. It is checking low on structure. Foy Boren et al have partially financed the cost of a wildcat to be drilled due north of the Seminole area, having been assigned lease on all of Section 212 by Humble Oil & Refining Company, and the west 480 acres of Section 202, both in W. T. Survey, Block G, by Standard Oil Company of Texas for the drilling of a test. Devonian Oil Company, R. Conkling et al's E. B. King 1, NEc Block 6, League 305, Dawson County School Lands, Gaines County, was drilling at 5310 feet.

Cochran County gained a new wildcat through The Texas Company having cleared location to drill H. T. Boyd 1, center Labor 25, League 56, Oldham County School Lands. It is 1½ miles southeast of oil production in the Duggan pool. Magnolia Petroleum Company's Wright 1, NEc Labor 7, League 96, Cochran County, situated 1½ miles

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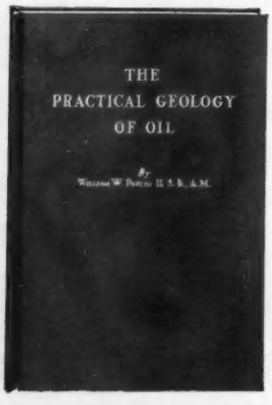

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WEST CENTRAL TEXAS

Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
Brown County—		
Brown-Tex Oil Co., Browder 1....	*	2462
Cunningham et al, Harris-Pittman 1	300	1912
Delmarva Oil Corp., Butler 1....	*	1351
Eakin et al, Williams 1.....	*	1100
Gilcrease Oil Co., Perry 5.....	12	1235
Hartzell et al, N. Rice 1.....	*	340
Harvey et al, Cox-McInnis 1.....	¶¾	2509
Hightower O&R Co., Payne 1.....	*	1655
McDonald & Cason, L. W. McDonald 1	*	800
Selvidge et al, Perry 1-B.....	10	1242
Weiner et al, Beck 1.....	*	2725
Callahan County—		
Howell et al, Vestal 1.....	*	3800
Johnson et al, Higgins 1.....	*	446
Phillips, Windham 1	*	4140
Price & Van Zandt, Sikes 1.....	2	295
Coleman County—		
Garrett Oil Co., Smith 1.....	*	2318
Phillips, Fowler 1	*	2298
Comanche County—		
R. D. Compton Oil Co., Griffin 1	*	2505
Loraine Oil Corp., Haile 1.....	12	2707
Eastland County—		
Hayner et al, Larkin 1.....	*	3098
Hickok Prod. & Dev. Co., Cleveland 4	129	4052
Lone Star Gas Co., Cozart 3.....	15	4070
Erath County—		
McGee Dev. Co., Robertson 1.....	*	3216
Palo Pinto County—		
Palo Pinto Oil Corp., Strawn 21..	10	3125
Parker County—		
Kelsey et al, W. M. Boyd 1.....	*	1205
Shackelford County—		
Hammond-Lawson Pet. Co., Lee 3-B	20	1090
Hart et al, Sedwick 1.....	*	853
Knight & Ewing, Jeter 12	46	1166
O'Dell et al, Lones 1	*	643
Pemeta Oil Co., McCasland 13....	7	721
McCasland 14	7	769
Simmons et al, Harvey 17	180	1715
Ungren & Frazier et al, McGown 2	485	3211
Wittmer O&G Properties, Nail 1..	18	1405
Stephens County—		
Lone Star Gas Co., Brooks 1.....¶	11½	2182

*Failures; †Junked; ¶Million cu. ft. gas.

north by east of a wildcat producer, logged a show of gas at 4750-55 feet, and was drilling with tools at 4770 feet. Top of solid lime was logged at 3980 feet, with an elevation of 3784 feet.

WEST TEXAS Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
Brewster County—		
Hess et al, Decie 1	•	925
Crane County (McCamey)—		
Gilcrease Oil Co., Gibbs-Conoco 19	72	2353
Ector County (Foster)—		
Broderick & Calvert, Foster 10	1060	4280
Shell, Witcher 4-A	1916	4185
Stanolind, J. L. Johnson 6	478	4235
Ector County (Goldsmith)—		
Gulf, Goldsmith 122	540	4269
Goldsmith 123	2392	4200
Goldsmith 124	3340	4188
Goldsmith 126	2072	4200
Landreth Prod. Corp., Scharbauer 4-M	1935	4164
Scharbauer 3-O	722	4193
Phillips-Pure, Cowden 40	4942	4180
T. P. Coal & Oil Co., Scharbauer 32	1298	4260
Ector County (Harper)—		
Amon Carter-J. W. Naylor, Parker 6	561	4398
Texas Co., Parker 5-B	1400	4200
Ector County (Jordan)—		
Worsham et al, Connell 4	150	3650
Ector County (North Cowden)—		
Landreth Prod. Corp., T. P. Land 4-C	1346	4275
Fisher County (Wildcat)—		
Owens-Snebold Oil Corp.-A. C. Verner, Milsap 1	•	3590
Gaines County (Wasson)—		
Humble, Riley 2	170	4975
Hockley County (Slaughter)—		
Stanolind, Slaughter 2	477	5038
Howard County—		
Sun, Snyder 5	110	2844
Jones County—		
Danciger, Edmonds 1	31	1953
Dunigan Bros.-Fred Hyer, Gaither 1	•	4831
Fain-McGaha Oil Corp., Doughtry 6	251	1931
W. J. Healey & Walters, Doughtry 4	318	1929
Humble, Hollums 13	480	3244
Hollums 14	475	3218
Hollums 15	950	3231
Huddleston 1	960	2923
Iron Mt. Oil Co.-Humble, Olander 6	2400	3236
Morten et al, J. W. Harris 1	•	2040
Outlaw et al, M. A. Moore 1	•	2002
Petroleum Prod. Co., Milsap 8	290	1941
S. B. Roberts & Co., Pritchard 2	•	2340
Loving County (Wildcat)—		
Porter-Rankin-Evans Est., Johnson 1	•	3214
Nolan County—		
F. Oyster-Ajax Drl. Co., Withers 1	•	4505
Pecos County (Masterson)—		
Street et al, Shearer-Texas Co. 2	158	1449
Shearer-Texas Co. 3	491	1457
Pecos County (Payton)—		
Pecos State Oil Co., Pecos River 1	103	2020
Pecos County (Pecos Valley)—		
Wesley O&G Co., Francis-Lewis 3-a	660	1836
Terrell County—		
Schermerhorn Oil Corp., Allison 1	•	2500
Upton County (McCamey)—		
Brown-Hancock-Hines Oil Corp., Baker-Conoco 8-D	1101	2292
Edwards & Moore, Burleson-Shell 1	569	2274
Humble, Ricker 25-A	137	2210
Ricker 21-B	269	2650
Sylva Oil Co., Baker-Conoco 7	1065	2365
Ward County—		
Mid-Continent, Sealy-Magnolia 1	335	3042
Wasomes Oil Co., Carnegie-Sinclair 3-B	20	2351
White et al, Monroe-Rector 1	•	4710
Western Well Service Corp., Johnson 2-B	326	2064
Winkler County (Emperor)—		
Phillips, McCabe 5	333	2950
Winkler County (Kermit)—		
Humble-Tide Water, Walton 14-D	480	2995
Magnolia, J. B. Walton 182	774	2921
Yoakum County (Bennett)—		
J. L. Crump-Black Bros., Bennett 3-B	2046	5240
Yoakum County (Wasson)—		
Murchison et al, Willard 2	128	5115

•Failures; †Junked; ¶Million cu. ft. gas.

North Texas Development

Young County wildcat flows 86 barrels its first hour.

K-M-A drilling volume continues steady decline.

Wichita Falls, Texas.—Deep lime prospecting in central Young County received encouragement through the completion of a semi-wildcat at Brazos-Young Corporation's H. J. Wray 1, Alex McLennan Survey, 3 miles southeast of New Castle. The well flowed 86 barrels of oil in 1 hour through ¾-inch choke from saturation at 4040-50 feet and 4250-57 feet, with 7-inch pipe cemented at 3950 feet. Scattered development in previous years has uncovered numerous pools from the deep lime in the east portion of the county, and the play is shifting to the mid-section where drilling blocks are available at reasonable terms for independents.

Phillips Petroleum Company's M. Servatius 1, SEc H&TC Section 78, Block 14, discoverer of deeper sand for the northeast extension of the South Vernon field, Wilbarger County, flowed 56 barrels of oil in 1-1/3 hours while running tubing, and later gauged 92 barrels in 3 hours through tubing choke for completion. Production is from sand at 2623-38½ feet.

Montague County recorded a wildcat failure when L. T. Burns et al's M. Mitchell 1, J. W. Massie Survey, 3 miles southeast of Ringold, quit after fulfilling depth contract at 4061 feet. Operations have been started on a projected 4250-foot test 1 mile west of Nocona. Youngblood & Foree are making the test on the J. E. Burnett tract, J. Lenow Survey A-433, and have sold lease spreads at $30 per acre.

Sinclair Prairie Oil Company's Hood 1, NEc ATNCL Section 18, a mile west of the Panther deep field, Archer County, shut down for orders after testing dry when formation tester was used at 4963-74 feet. It is low on structure, having logged top of lime at 3865 feet. Blackwell Oil & Gas Company and Helmerich-Payne's Wilson 2, SEc Lot 11, Section 25, first deep lime strike for the Panther area, failed to qualify as a commercial well in broken saturation at 5105-16 feet, and is drilling at 5210 feet.

K-M-A field has not reached bottom on its drilling slump, having declined to 82 operations the past week. This deep area accounted for 11 new tests, as compared to 12 the previous week, and has 25 tests in process of completion. There are 18 tests drilling with rotary above the Strawn section.

The revised proration schedule credits K-M-A with 768 Strawn wells as of October 1, with an aggregate of 13,491 producing acres, based upon acreage unit assignments. The base allowable for the field is 22,744 barrels daily, and 32 barrels per well daily, but 8 production holidays to be observed during the month along with pipe line proration materially reduces the actual withdrawals. Thirty wells have a base allowable of 20 barrels or less daily due

TEXAS PANHANDLE Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
Carson County—		
Cities Service, Poling 1-E	•	3305
Huber Pet. Co., Burnett 10-R	¶28	2693
Hutchinson County—		
Burch et al, W. E. Herring 4	702	3160
Continental, Sanford 2-A-C	44	2735
Magnolia, sw Oil & Dev. Co. 8	567	3125
Phillips, Dunaway-Way 1	¶15.4	3185
Power Pet. Co., Jordan 3	415	3162
Roberts County—		
Chicken Creek Oil Co., Lederick 1	•	6860

•Failures; †Junked; ¶Million cu. ft. gas.

NORTH TEXAS Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
Archer County (K-M-A)—		
H. A. Schaeffer Oil Co., Ferguson 4-A, blk 15	584	3862
Staley Oil Co. et al, Mangold 5, blk 30	488	3890
Archer County—		
Brown et al, Ford 2	•	1102
Underwood Drl. Co., Campbell 28-B, sec 1378	100	1017
Campbell 31-B, sec 1377	•	984
Clay County—		
Duncan & Arnhold, T. P. Duncan 2, blk 14	15	1160
Gray & Thweatt, Enyart 2, blk 7	6	287
Hudson et al, Big Wichita River 4	2	178
Jo-Ellen Oil Co., Big Wichita River 5	100	1120
Metzner & Burns, Thornberry 13-A, blk 6	6	211
Murchison et al, Doyle 1, blk 44	†	1382
Cooke County—		
Seitz-Comegys & Seitz, Felderhoff 1-B	63	1214
Sinclair Prairie, S. H. Putman 1	•	6055
Trumter Oil Co., C. E. Stacey 10	63	740
Jack County—		
Gen'l. American Oil Co., Guntner 1	•	3253
Montague County—		
Continental, Seitz et al, Hott 17	152	2126
Gibson-Jennings, Inc., R. Howard 3, blk 90	•	2395
Wichita County (K-M-A)—		
Bridwell Oil Co., T. A. Womack 6, lot 2	600	3839
Christie-Hickman Drl. Co., Bolding-Lowery 9, blk 23	1000	3870
Continental, Kempner 2-B, blk 18	368	3833
Curtis & Caraway, James 1, sec 16	•	4028
E. C. Oil Co., Lewis 4-A, blk 20	640	3791
Fain-McGaha Oil Corp., Fain Bros. 8	936	3855
Geier Bros.-Jackson, Preston 2	•	4025
Golding Est. & Cochran, Preston 4, sec 27	1184	3953
Hamilton et al, Martin 1-A, sec 36	1120	3787
Hammon, Hanlon-Buchanan, Fassett-Tuttle 15, sec 2	624	4013
King Oil Co.-Perkins-Cullum, Pettit 6, sec 27	840	3725
Stump et al, Michie 1	•	4001
S. K. Vierson-A. D. Cochran, Wigler 1-A	230	3980
Wegener et al, First Nat'l. Co. 5, blk 26	784	3825
Witherspoon-W. A. Delaney, G. L. Nance 2	288	3881
Wichita County—		
Blair et al, Honaker 2	•	450
Consolidated Oil Co., Griffin 1-A, sec 9	•	642
Fresno Oil Co., Ramming 1-A, sec 1	•	2836
Wise County—		
Bilbray et al, Guess 1, blk 41	•	1092
Young County—		
Delmarva Oil Corp., Ragle 1, sec 177	•	1102
Humphrey et al, Burnett 1	•	4160
Pemeta Oil Co., Cole 4, sec 3403	•	742

•Failures; †Junked; ¶Million cu. ft. gas.

to being situated on fractional units, else are incapable of making their marginal quota. Extra production restrictions imposed by purchasers in order to absorb unconnected wells have been retained during the 5-day week period, and effective October 1, Sinclair Prairie Oil Marketing Company lowered its runs from 75 to 65 percent of the allowable. The company did not reduce its nominations, as the cut was made to provide for additional connections made during the past month.

The North Texas district, exclusive of the K-M-A and Panther fields, has 16,240 wells, according to new schedule prepared by Jack Elliott, deputy supervisor. Wells subject to proration are allowed 5 percent of their rated potential after deducting the marginal allowance. The potential rating per well is pegged at 500 barrels, thereby permitting a maximum base allowable of 44 barrels daily. Comparatively few wells qualify for the latter. Although all 5 of the recent Canyon sand-lime completions near the 2600-foot level in southern Wichita County receive the top allowable.

Louisiana contests federal claim of coast areas

State officials of Louisiana have warned prospective mineral lease bidders that the state would fight to maintain its asserted ownership of several small islands on the Gulf Coast, although the federal government claims the ownership. Secretary of Interior Ickes has called for bids for leasing the islands for exploration for oil, gas, or other minerals. The bids, on East Timbalier or Bird Island (295 acres) and two smaller adjacent islands (81 acres), will be accepted by Ickes until October 31.

East Texas Developments

Lower Trinity gas production will be aid to big field.

Deep test in Bethany field plugging back to test shows.

Kilgore, Texas.—Completion of a second gas-distillate well in the Lower Trinity on the east flank of the Gregg County sector of the East Texas field definitely establishes the presence of an important reservoir of high-pressure gas production that will eventually be utilized for lease operation and repressuring the giant field. Humble Oil & Refining Company and Gulf Oil Corporation's Horton-Dickson 1, H. G. Hudson survey, 3 miles east of Woodbine production and 1⅝ miles southwest of their deep discovery, gauged 8,970,000 feet of gas with a spray of distillate initial, through 20/64-inch tubing choke, from Pettit zone at 7305 feet. Closed-in pressure on tubing registered 2800 pounds, and 2650 pounds on casing.

Resumption of development of the Opelika deep pool, Henderson County, has been undertaken by Tide Water Associated Oil Company et al in clearing location for S. S. McGee 1, located 1500 feet from the west and 700 feet from the north lines of 342-acre tract, R. Acosta survey. It is to try for production in the Lower Trinity. Location is more than a mile north of the discovery producer, which averages 25 barrels of oil daily with the aid of input gas through partially junked hole at 7195 feet. Gas is obtained from a nearby prolific gas-distillate well in the Lower Glen Rose at 7910-50 feet. The latter failed to encounter oil in drilling to 9320 feet. The new project will seek oil production on the north flank of the structure, and equal interests are held by Seaboard Oil Corporation and Humble Oil & Refining Company.

The Cayuga field, Anderson County, contributor of the first sustained Lower Trinity production in the Woodbine belt, recorded its third deep gas-distillate well and a 1½-mile northwest extension when Roeser & Pendleton's Bowyer 3, E. Ritter Survey, gauged 260 barrels of 65 gravity distillate and 6,000,000 feet of gas initial through ½-inch choke from the Lower Glen Rose at 7640 feet. The original hole, which was carried to 7676 feet in July, 1937, was sidetracked and re-drilled because of parted casing. The company will seek an authorization from the commission to make a 30-day production test under choke. The performance of the well will determine if a gas recycling plant, or natural gasoline plant will be erected on the site. Residue gas would be returned to the Woodbine oil sand when produced in excess of gas sales contract.

Bethany deep test to try show in lower Marine

Shreveport. — Having recovered all but 300 feet of drill pipe hung in the hole, The Texas Company last week had cemented 6⅝-inch casing in Claude Adams 1, Thomas Cox Survey, deep test in the Bethany field, Panola County, Texas.

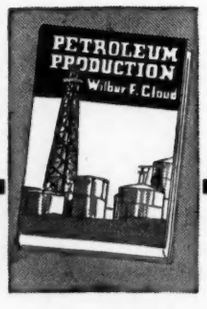
The hole which had reached 11,303 feet, penetrating Permian salt topped at 11,067 feet, was plugged back to 9100 feet. Casing was being tested Thursday preparatory to perforating for tests in the lower Marine, which was logged at 7792 feet.

Most promising formation logged in this test was from 8280 to 8320 feet in what corresponds to the Bodcaw or "E" sand of the lower Marine series at Cotton Valley, Lousiana. It also logged some porosity in the "D" sand, also productive on the flanks at Cotton Valley.

Having missed production in all Glen Rose horizons producing at Rodessa, Bateman Drilling Company's Jaynes 1, A. Douthette Survey, Cass County, outpost northwest of Lodi, was shut down at 6505 feet, contract depth, but may be taken to basal Glen Rose lime.

In the new southwest offshoot of the Jefferson area, Marion County, Arkansas Fuel Oil Company's Hussey 1, Charles Lockhart survey, drilled ahead at 5792 feet, after logging massive anhydrite at 5540 feet (elevation 202 feet), this marker being 8 feet lower than the same company's Pitts 1, Charles Lockhart Survey, a Hill horizon wet gasser, and 51 feet lower than the same company's Johnson 1, Alexander Johnson

PETROLEUM PRODUCTION



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Survey, which produced oil in the Henderson-Gloyd.

Pundt & Cope have purchased the holdings of Redditt & Gray in the area southwest of Joaquin, including Redditt & Gray's Pickering Lumber Company 1, completed over one year ago as a gas-distillate well at 4109 feet in the Paluxy. Redditt & Gray received a cash consideration and retained a sixteenth over-riding royalty. A third test is being drilled on the holdings at present.

Around Geneva in Sabine County, W. C. Windsor of Tyler, Texas, is adding to his holdings, securing leases around the Naomi Markey, S. P. Tatum and adjacent surveys. In southwest San Augustine County, Republic Production Company has a torsion balance unit at work.

In Bowie County, northeast Texas, around the Charles Lewis, George Callum, Francis Sithe, G. Warnell, and J. Jackson Surveys, J. K. Thatcher and associates have secured about 3000 acres of a proposed 10,000-acre block.

A hearing to fix operating rules for the La Rosa field, Refugio County, has been reset for October 13 by the Texas Railroad Commission. The hearing was originally scheduled for September 29, then postponed to October 10. It will be held at Austin.

EAST TEXAS Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
Joiner Area—		
Art Oil Co., Tolliver 2	2000	3668
Humble, Wooster 12 (74.23-ac)	3500	3733
Hunt Oil Co., Ashby 20-C (99-ac)	240	3614
Ohio, Moores 51 (200-ac)	2000	3680
Moores 53 (200-ac)	1500	3725
Kilgore Area—		
Gulf, Florence 23 (165.09-ac)	3800	3659
Muckelroy 32 (152.05-ac)	9400	3542
S. P. Jones & Bros., Brock 4 (6¼-ac)	7200	3636
Lacy et al, Fee 8-B (3.06-ac)	4000	3557
Magnolia, Hilburn 6 (34.79-ac)	2600	3734
M. Nathan Pipe & Supply Co., Miller 4 (37.49-ac)	500	3597
Shell, Willoughby 24 (57.7-ac)	4000	3607
Willoughby 25 (57.7-ac)	4500	3621
Sun, Beall 29 (180-ac)	7000	3585
Longview Area—		
Bradley et al, Smith 10 (28½-ac)	3500	3647
Cities Service, Lee 29 (187.18-ac)	7500	3606
Cushing Drl. Co.-Long, Owens 31-A (209-ac)	1200	3570
Fidelity Oil & Roy. Co., Akin 3 (4½-ac)	8000	3523
Gen'l. American Oil Co., Sanders 19-B (59.88-ac)	5000	3665
Victory 5-C (10-ac)	2600	3611
Humble, Holland 38 (201.63-ac)	8800	3625
Holland 39 (201.63-ac)	9000	3670
Mallison Oil Co., Everett 3 (20-ac)	900	3605
Reynolds et al, Miller-Humble 7 (104.8-ac)	160	3783
Shell, Moore 40 (303.7-ac)	6800	3613
Stanolind, Calvin 16 (62.02-ac)	7500	3632
Whatley 16-A (51.76-ac)	5500	3551
Anderson County (Cayuga)—		
Philtop O&G Co., Ware-Tidal 2 (140-ac)	1200	4092
Anderson County (Long Lake)—		
F. H. E. Oil Co., Passoney 2 (53-ac)	600	5366
Angelina County—		
Bonham et al, Cameron 7	•	619
Freestone County (Cayuga)—		
Carter-Gragg Oil Co., Harwell-Magnolia 1-B (60-ac)	¶100	4046
Houston County (Navarro Crossing)—		
Sun, Dailey Bros. 1 (1367-ac)	5	5893
Titus County (Talco)—		
Humble, King-Hughes 60 (1053-ac)	235	4263
Leon County—		
Wynne Drl. Co. et al, Brown-Sinclair 1 (43½-ac)	•	6092
Limestone County—		
Stroud Gas Co., Adkins 1	•	865
Navarro County—		
Sitton & Ivey, Marshall 2	2	653
Touhy & Darnes, G. H. Love 1	•	975

*Failures; †Junked; ¶Million cu. ft. gas.

Southwest Texas Fields

Lower Coast area passes week without an important strike. Ezzell extension well makes big area look good for oil.

Corpus Christi.—Lower Gulf Coast of Texas completed its first week in many months without a discovery of some sort. Marking a decline in drilling operations along this trend, wildcatting successes materially ebbed, no material field extensions being reported, new sands opened nor producing areas indicated.

The most promising spot along the trend at this time is La Rosa field, Refugio County, where Geophysical Service et al's explorations have proved a multi-sand Frio zone area. During the past week, this concern's offsets to the south and east of the deep discovery cored the pay and were ready for completion. Rooke 3, 933 feet south of production, was at 5920 feet, drilling plugs, while Spalding 1 was coring deeper into the sand below 5910 feet after drill-stem test was made at 5900-06 feet. It flowed pipe line oil with 110 pounds pressure in 23 minutes. Pat Rutherford's Schirmer 1, wildcat east of production in Section 1, was going ahead after drill-stem test in the discovery sand at 5408-34 feet developed salt water, seat on tools being 5430 feet.

Several deep wildcats are being drilled along this trend. Union Producing Company's Brown 1, at Agua Dulce in Nueces County, was below 11,465 feet, drilling in heaving shale. Hiawatha Oil & Gas Company's Roemer 2, on the Seadrift prospect in Calhoun County, had progressed to 8359 feet, and was going ahead, reportedly passing through several sands with oil and gas shows. Jim Wells County, too, had a deep test holding considerable interest. It is Garcia 1, east of the Bandera field, and is progressing near 8000 feet.

Magnolia Petroleum Company's Seeligson 10, ¼-mile west of production in the East Premont field, Jim Wells County, was waiting on cement after a plug-back job from 6602 feet, where production test netted salt water.

Illinois Petroleum Company et al's Wilson 1, 3 miles west of Sinton in San Patricio County, was fishing for drill stem at 5913 feet. The well has had a series of oil and gas shows in good sand bodies below 5000 feet, but none have provided sufficient oil on drill-stem tests to indicate commercial production.

Ezzell production extended southeast by good well

Laredo.—Harry Ezzell's Fee 22, which extended the Ezzell field of McMullen County 6000 feet to the southwest, flowed 396 barrels of oil on a 12-hour test through open tubing, registering pressures of 75 pounds on tubing and 385 pounds on casing. The well had been drilled to 1534 feet, set casing on bottom and was finished through 30 perforations at 1507-17 feet. The size of this well indicates potentialities of the area to the southwest.

Ezzell field is due to receive a heavy drilling program by Edwin M. Jones and Harry Ezzell, who control the entire block.

Munson field, also in McMullen County, received a set-back and an extension. Bishop Oil Company et al's Nueces Land & Livestock Company 1, 440 feet north of production, was a failure in the sand at 1195-1207 feet, the zone carrying only a slight odor. It was abandoned at 1348 feet. About ¼-mile southwest of production, J. D. Clair Smith and Joe Cosner's Nueces Land & Livestock Company 1 was drilling plugs after coring oil sand at 1156-61 feet.

Gilcrease Oil Company's attempt to open a new and deeper sand in the Comitas field, Zapata County, proved of no avail and A. D. Haynes 31-B, Section 4, was abandoned. It tested salt water in a new sand at 1218-22 feet, 100 feet below the regular pay.

Phillips expanding holdings in Rio Grande Valley area

Mission.—One of the largest lease deals in months in the Rio Grande Valley deep basin was reported to be near completion last week. Phillips Petroleum Company will acquire 13,000 acres, plus one producing well and another drilling operation in the McAllen field, Hidalgo County. The transaction was in the form of an option on the properties of R. E. Harding et al and Burton McCollum. The block is 8 miles wide and 11 miles long and centers around McAllen.

This field was opened in August by W. W. Woody (or Lynn) 1, which flowed 61.5 gravity distillate from perforations at 5970-74 feet, this being in Frio sand. A second test is being drilled below 7000 feet by Harding and associates.

Phillips Petroleum Company already had acquired 750 acres of leases in this block from Ralph E. Fair, who drilled the discovery test and is drilling the second well under contract. This company has been expanding its deep wildcat and proven reserves in the lower Rio Grande Valley. It also is carrying on a deep development and exploratory program, now drilling below 8760 feet in Flores 1, deepest test ever drilled in the Samfordyce field.

One new producing area was added in the territory by Harvey and Henderson and Hagan and Stewart's Zaragoza Salinas 1, in the Sacatosa Grant, 4½ miles west Viboras. The test was finished in Government Wells sand at 1644-60 feet, where it flowed an estimated 2,000,000 cubic feet of gas per day through ⅜-inch choke under working pressure of 180 pounds. The well had been carried to 1705½ feet, but

was plugged back and completed through perforations.

Sun Oil Company's two tests in the new Sun pool were at critical stages. Oliverez 1, Section 239, west of the pool, was coring for the 4800-foot sand, while Speer 1, Section 274, southwest of the area, was drilling below 4000 feet.

Ask 40-acre spacing for Sun field in Starr County

Sun Oil Company has requested 40-acre spacing for wells in the new Sun field, Starr County. This request was presented at a hearing before the Texas Railroad Commission last week and was approved by other major operators in the field.

Independents, however, protested the wide spacing and, with one exception, asked that 20-acre spacing be allowed. Circle Oil Company, however, sought 10-acre spacing.

Sun Oil Company brought out a new basis for wide spacing at its hearing. F. E. Heath, petroleum engineer, testified that the oil had very low gasoline content, despite the fact that it was 45 gravity. He stated further that the gasoline produced was of a very low octane rating and that for this reason he expected the market for the crude to be limited. The oil is now bringing $1.00 a barrel and only 1000 barrels have been sold.

In support of these arguments Sun Oil Company attorneys contended that the development in the field should begin on the basis of wide spacing, and if subsequently the necessity for closer spacing was proven, the additional wells could be drilled. They pointed out that if the drilling was begun on the basis of closer spacing, then it would be impossible to reduce the number of wells in the field.

The discovery well, Sun Oil Company's McKinney 1, topped the pay at 4842 feet and was still in the producing sand at 4858 feet, the bottom of the hole. Neither free gas nor water was encountered near the producing horizon, but Heath expressed the opinion that, because both gas and water are common in the area, further drilling was likely to disclose the presence of bottom water which would furnish a water drive, and a gas cap near the top of the structure.

In estimating the probable limits of the field Heath said that tests indicated it might include as much as 10,000 acres. This estimate was based on results obtained from some 40 core tests drilled to depths ranging from 1100 to 1600 feet.

The sand in the area has a porosity of 26½ percent and a permeability of 830 milli D'Arcys.

Heath said that the new production was approximately 300 feet above the Vicksburg in the basal Frio and he expressed the opinion that it was unlikely production would be continuous from the Sun well to the Humble Oil & Refining Company's Kelsey-Bass 2 which is the closest producing well, and likewise marks a new discovery in the area.

Clear Lake hearing reset October 18

A hearing to fix operating rules for wells drilled in the Cleak Lake field, Harris County, has been reset for October 18 at Austin. The hearing was recently postponed to October 4, because West Production Company did not offer sufficient evidence upon which to base regulations.

Texas drilling permits

The Texas Railroad Commission last week approved permits for drilling 216 new wells in Texas, 152 less than were allowed the week before.

Two permits were approved in the East Texas field in Gregg County, while three locations were reported from the remainder of the East Central Texas area.

There were 43 new locations reported from West Texas, while 26 permits were allowed in the West Central Texas area.

Operators in the Gulf Coast were allowed 47 new locations including 11 in Refugio County. There were 45 permits approved in Southwest Texas with 18 in McMullen County.

The commission allowed 32 new locations in North Texas, including 10 in Wichita County. Panhandle producers reported 18 locations.

El Dorado, Ark.—Five drilling permits were issued last week by the Arkansas Board of Conservation as follows: Little River County—C. & M. Drilling Company, John Strawn 1, located 330 feet south and east NWc SE SW 7-10-32; Union County—Lion Oil Refining Company, Marine 6, located 330 feet south and east NWc SW NW 20-18-17; Fohs Oil Company, Craig et al 1, located 660 feet north and west SEc SE NE 5-18-14; Miller County—The Gerhig Company of Arkansas, H. C. Mitchell 3, located 330 feet north and 334 feet east SWc SW SE 2-20-28; Ouachita County—Gulf Refining Company, S. L. Johnson 5, located 380 feet east and 200 feet north SWc SE SW 29-15-15.

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SOUTH TEXAS Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
SAN ANTONIO DISTRICT		
Bexar County—		
Owen, Fest 6, Von Ormy	3	720
Putnam, Wetz 13, Von Ormy	3	692
Caldwell County—		
Ogden, Lackey 5-A, W. Dale	*	2470
Robinson & Coffield, Young 6, Branyon	¶1	1502
Guadalupe County—		
Hamill & Hamill, Zuehl 1, V. Duran sur	*	640
Maverick County—		
Lockhart, Asbrook 1, sur 83	*	4045
Medina County—		
Felty, Schweers 1, Bryan sur	*	755
Murrell, Fee 4, Chicon Lake	2	380
Travis County—		
Priest, Mozach 1, Leavy sur	*	856
LAREDO DISTRICT		
Duval County—		
Buchanan, Foster 3-B, Eagle Hill	150	1525
Foster 5-B, Eagle Hill	99	....
Continental, Driscoll 27-A, Driscoll	288	3372
Cosner, Garcia 1, sec 409	*	5263
Cox & Hamon & Gorman-Yoakam, Cuellar 39, Hoffman	175	2825
Cuellar 42, Hoffman	171	2835
Cuellar 45, Hoffman	281	2811
Cuellar 46, Hoffman	243	2811
Cuellar-Points 10, Hoffman	172	2805
Hoffman-Fair 5, Hoffman	170	2745
Government Wells, Lundell 29, Lundell	100	1526½
Hiawatha, Parr 17, North Sweden	133	4740
Southland 11, North Sweden	*	6510
Magnolia, Duval Ranch 11, sec 291, Casa Blanca	¶2	1300
Noack, Lanning & Evans, Peters 2, Rancho Solo	106	1888
Pearl, Smith-Corkill 1, Hoffman	*	3541
Porter & Wheelock & Collins, Driscoll 3, Fitzsimmons	400	4385
Porter, Fitzsimmons 5-A, Fitzsimmons	500	4355
Schimmel, Hagist 7, Los Picachos	*	2176
Standard of Kansas, Rossi 14 North Sweden	150	3888
Stewart & Nye, Welder 1, sur 213	*	2818
La Salle County—		
Garner, Dovre & Brown, Yeager 3, sur 37	*	755
McMullen County—		
Bishop, Nueces 2-B, Munson	*	1348
Ezzell, Fee 22, Ezzell	892	1535
Starr County—		
Dodd, Wood 1-A, S. Ricaby	206	1789
Graham, Gutierrez 1, por 88	¶2	2987
Harvey & Henderson, Salinas 1, Sacatosa gr	¶2	1705½
Webb County—		
Gage & Dawson, Bruni 1, Cole	*	2588
Superior, Spain 1, CCSD & RGNG RR sur	*	2855
Zapata County—		
Gilcrease, Haynes 31, Comitas	*	1222
Texas, Jennings 121, Escobas	15	1319
CORPUS CHRISTI DISTRICT		
Bee County—		
Pettus, Ray 1, Mangum sur	*	4305
Calhoun County—		
Humble, Vandenberge 5, Heyser	375	5477
Bowles, Ragland 4, Alice	700	5280
Coates, Stillwell 3, Alice	500	5294
Howell, Stillwell 1, Alice	500	5325
Reese & Dunn, Stillwell 1, Collins subd	525	5363
Karnes County—		
Arnott, Stead 1, Burns sur, South Burnell	*	3702
Live Oak County—		
Wellington, Sanger 1, sec 349	*	3520
Nueces County—		
Killam, Ellick 9, Clara Driscoll	350	5364
Morgan, Morgan 10-C, Turkey Creek	250	3868½
Phillips & Hinds, Driscoll 1-A, Clara Driscoll (perf 5425-40 ft)	160	6608
Phillips, McKenzie 6, Turkey Creek	500	5820
Seaboard, Luby 38, Luby	500	5180
Simmons, Harrell 1, Saxet	300	4852
Stanolind, Spessard 14, Luby	475	4360
Spessard 15, Luby (perf 4354-58 ft)	475	5063
Refugio County—		
Copano, O'Connor 14-B, Tomoconnor	900	5920
O'Connor 17-B, Tomoconnor	1200	5924
O'Connor 21-B, Tomoconnor	950	5916
Houston, Pratt-Hewitt-Rooke 56, Refugio	600	6404
Morgan, Mitchell 2-D, Refugio	725	7150
Quintana, O'Connor 34-C, Tomoconnor	2500	5925
W.R.R., State 3, Refugio	450	....
Victoria—		
Magnolia, Lander 11, Heyser	750	5590

*Failures; †Junked; ¶Million cu. ft. gas.

Texas Gulf Coast

New oil field in Chambers County Cotton Lake area. Katy gas production extended; campaign on in field.

Houston.—A new oil field was discovered northwest of South Cotton Lake field, Chambers County, last week when F. A. Gillispie's Kirby Petroleum Company 1, West Cotton Lake area, Chambers County School Land Survey, came in flowing oil and wash water at the rate of 5 barrels per hour from lower Marginulina formation. The wildcat was drilled to 6523 feet and 5½-inch casing was set at 6470 feet. It was perforated with 35 shots from 6415 to 6434 feet and the hole was washed. It came in flowing through a ¼-inch choke, tubing pressure 45 pounds and casing pressure 825 pounds. Later the tubing pressure increased to around 350 pounds. The well is reported to be making no salt water.

South of production at Cedar Point Chambers County, Standard Oil Company and Salt Dome Oil Corporation are completing State 2-118 at 6000 feet. It is flowing 450 barrels of pipe line oil daily through ¼-inch choke. Flow is from sand at 5959 to 6000 feet. Top of the gas sand was encountered at 5950 feet and 7-inch casing was set at 5965 feet. The operators are making location for another well still further south.

Four miles south of Anahuac and in E. Douthit Survey, Salt Dome Oil Corporation's Ogden 1 appears to be a failure. Salt water sands were cored in Frio formation. The hole is down to 7900 feet and will be carried to 8000 feet, contract depth, before being abandoned. Salt water sands were cored from 7550 to 7580 feet. A gas show was encountered from 7520 to 7530 feet.

Southeast of production at Katy gas field, Waller County, Stanolind Oil & Gas Company completed a good gas well last week. F. Young 1, T. S. Reese Survey, made an estimated 25,000,000 cubic feet of gas daily through 2-inch tubing. Tubing pressure was 2400 pounds and the casing was sealed. Young 1 was perforated from 7340 to 7360 feet. The same operator's Freeman 1, which was drilled to 11,066 feet and plugged back, was completed after perforating casing from 7365 to 7385 feet. It made 4,400,000 cubic feet of gas daily through ¼-inch choke. Tubing pressure was 2500 pounds. Stanolind Oil & Gas Company is drilling a number of gas wells at Katy to furnish United Gas Company with gas.

Northwest of Wharton, Wharton County, Western Gulf Oil Company abandoned Rust 1, A. Jackson Survey, last week at 6120 feet. An electrical logging device was run and no shows of importance were cored.

In Brazoria County, the Anchor prospect is receiving its first test. Illinois Petroleum Company made location for I. W. Masterson 1, 466 feet out of the northerly northeast corner of Masterson 900-acre tract in the Geo. Robinson Survey.

On the flank of Stratton Ridge, Brazoria County, Sterling Oil & Refining Company made a test on Kramer 1, T. W. Grayson Survey, which showed salt water. Casing was perforated with 38 shots from 4315 to 4325 feet. A drill-stem test recovered 3600 feet of salt water.

Southwest of Conroe, Montgomery County, Frazier & Bunte's Chase National Bank 1, D. Garrett Survey, cored salt water sands from 5397 to 5406 feet and were drilling in shale at 6756 feet at the end of the week.

Four miles southwest of New Caney, W. C. R. R. Section 11, Montgomery County, C. G. K. M. Oil Company's Floyd Oil Company 1 was abandoned at 6608 feet. No shows of importance were cored in this wildcat.

Northeast of production at Fairbanks, Harris County, Stanolind Oil & Gas Company is preparing to make another test on Schumacher 1, J. Doswell Survey. Last week casing was perforated with 30 shots from 7201 to 7206 feet and the well flowed gas and salt water. The perforations have been squeezed with cement. The hole will be plugged back and the Look sand will be tested.

Northwest of production at Eureka, Harris County, Jack Frazier's L. Lackner 1 made 476 barrels of fluid daily, 12 percent salt water, through ¼-inch choke from a new sand. Casing was perforated from 8082 to 8094 feet. Tubing pressure was 1450 pounds and casing pressure 1700 pounds.

At Cheek, Jefferson County, Shell Petroleum Corporation is still testing Pleasant 1 at 7721 feet. A drill-stem test was made last week and the well attempted to blow out.

At Clam Lake, Jefferson County, Shell Petroleum Corporation's McFaddin 3 cored the same sand that was found in McFaddin 2 but is drilling deeper to the regular pay horizon. The oil sand was cored from 3802 to 3815 feet. A drill-stem test from 3800 to 3815 feet showed 450 feet of oil and a little mud. The hole was cored down to 3830 feet and it was broken sand formation with oil shows. From 3833 to 3834 feet and from 3870 to 3871 feet was sand showing oil.

TEXAS GULF COAST
Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
Clinton—		
Stanolind, Weber 2	278	4035
Dickinson—		
Atlantic, Potter 1	675	8121
Coast Pet. Corp., M. Stewart 10	625	9009
Pure, Sealy Hutchins 3-A	133	8102
Eureka—		
Jack Frazier, L. Lackner 1	476	8094
Fairbanks—		
Amerada-Stanolind, Kurasz 2	562	6844
Carroll Oil Co., Johnson 5	65	6850
Friendswood—		
Humble, Koisling Dixon 6	595	6046
Hardin—		
Gulf, Tullos 2	345	7633
Smith-McDannald, Rives 2	486	7620
Texas Co., Cessna 1	45	7650
Woodley, Davis 2	506	7656
Hastings—		
Stanolind, McDonald 2	388	6080
Moore B-1	145	6080
Hitchcock—		
M. Stewart, Fee 6	475	5149
Humble—		
Glass Oil Co., Herman 24	25	1008
J. E. Thompson, Higgins 6	1	742
Katy—		
Stanolind, Freeman 1, dr to 11,066 ft, pb and comp.	¶4½	7385
Young 1	¶25	7360
Manvel—		
Texas Co., HOFA 33	520	5675
Orchard—		
Duval-Texas Sulphur Co., Moore B-2	*	1039
South Cotton Lake—		
J. R. Turnbull, Casey 2	108	6528
Tomball—		
Humble, Hillegeist 5	120	5584
Tomball-State A-2	432	5557
West Columbia—		
Texas Co., Abrams 27	480	5585
Withers—		
Texas Co., Pierce Estate B-22	214	5562
Pierce Estate C-51	114	5546
Montgomery County—		
C. G. K. M. Oil Co., Floyd Oil Co. 1, sw of New Caney, W. C. R. R. sur	*	6608
Wharton County—		
Western Gulf, Rust 1, nw of Wharton, A. Jackson sur	*	6120

*Failures; †Junked; ¶Million cu. ft. gas.

Tanker explodes and sinks off Florida coast

Two hours after having been set afire by an explosion of undetermined cause, the 435-foot Standard Oil Company of New Jersey tanker E. J. Bullock, headed from Smith's Bluff, (Beaumont) to Baltimore, with a cargo of 80,000 barrels of East Texas crude oil, sank late October 6 in the Gulf of Mexico south of Key West, Florida. Two men were reported missing when 35 members of the crew were picked up from two life boats by another tanker, and one of the rescued men died soon after being picked up, while another was reported injured. The two missing men were believed to have been trapped by the explosion.

State leases given up in North Dakota

Bismark, N. D.—The California Company last week surrendered its lease on 3520 acres of state-owned school lands in northeastern McKenzie County, announced Land Commissioner Ole B. Stray. The acreage is east of Schafer and in Keene and Blue Butte Townships northeast of Watford City.

The company, which drilled Nels Kamp 1, Section 3-154n-96w, Williams County, to 10,281 feet this summer before abandoning the hole when a broken bit could not be recovered, had extensive geophysical surveys made of lands in northwestern North Dakota during the past year. Leases on more than 10,000 acres are still held by the company, and "officials apparently intend to hold the rest of the leases," Stray said.

Shreveport—Forty-two drilling permits were issued last week by the Louisiana Conservation Commission of which 16 were in North Louisiana as follows: Bossier, 2; Caddo, 4; Claiborne (Lisbon), 1; DeSoto, 1; Red River, 1; Union, 4; and Webster (Cotton Valley), 2. The 26 in South Louisiana were divided among the following parishes: Acadia, 5; Ascension, 2; Beauregard, 3; Calcasieu, 2; Cameron, 2; Evangeline, 4; Iberville, 1; LaFourche, 2; Plaquemines, 1; St. James, 1; St. Mary, 1; Terrebonne, 1; Vermilion 1.

South Louisiana

Test new sand showing northeast of Tepetate production. Lake Barre may be another 10,000-foot producing area.

Lake Charles. — Atlantic Refining Company will attempt to open a new oil field northeast of Tepetate, Acadia Parish, this week, having run 7-inch casing to 8705 feet in Klumpp 1, Section 12-7s-2w. Pipe will be perforated from 7957 to 7968 feet in sand. An electrical logging device showed 15 ohms from 7943 to 7957 feet. No report was given on the sand from 7957 to 7968 feet.

On the north flank at Gueydan, Acadia Parish, Burton-Sutton have made location for a deep test at Simon et al 1, 6200 feet south 44 degrees and 600 feet north 75 degrees 44 minutes west of the northeast corner of Section 37-11s-1w.

Shell Petroleum Corporation made two drill-stem tests on Burdin 1 at West Lake Verrett, St. Martin Parish, last week and recovered gas and salt water. Burdin 1 was drilling in shale at 7530 feet at the end of the week. The first drill-stem test was attempted from 7060 to 7068 feet. After the testing tool was open two minutes the seat slipped to 7064 feet and recovered mud and salt water. Test from 7470 to 7484 feet through ¼-inch chokes showed 155 pounds pressure.

On the Lake Mongoulois salt dome, St. Martin Parish, The Texas Company was coring below 9342 feet in State 6 after coring a sand and lime formation with a slight odor and cut of oil from 9290 to 9300 feet. Also in St. Martin Parish and on the Henderson salt dome, The Texas Company was using the hole made by St. Martin Land Company 11 for geophysical purposes. The hole was drilled to 9404 feet in salt, topped at 8912 feet. Seven-inch casing was set at 8912 feet.

Gulf Oil Corporation is preparing to make a production test of a new sand at Timbalier Bay field, Lafourche Parish. State Timbalier Bay PP 4 was perforated from 5330 to 5340 feet with 20 holes and the hole is being swabbed. Last week a drill-stem test of this sand showed 13 stands of oil and 1 stand of mud through ¼-inch chokes in 10 minutes.

At Raceland, Lafourche Parish, Amerada Petroleum Corporation and Louisiana Land & Exploration Company are swabbing South Coast Corporation 2 from a new sand, showing gas and wash water. Casing was perforated with 98 holes from 11,840 to 11,960 feet.

In Assumption Parish, Humble Oil & Refining Company has made location for a deep wildcat. Milliken & Farwell 1 is 1850 feet west of the east line and midway between the north and south lines of Section 15-14s-4e or 1820 feet south and 11,400 feet west of the northeast corner of 14s-14e. It is on the Labadieville prospect. The company also made two other important locations in the southeastern portion of the Louisiana Coast. At Potash, location was made for Orleans Levee Board 37, 800 feet northerly from Orleans Levee Board 36 and in line with 36, and Orleans Levee Board 5 being 715 feet northeast along the northwest line of Section 13 from the west corner and 380 feet southeast at right angles in Section 13-18s-15e. It is near the company's abandoned 10,025-foot test. At Lirette, Terrebonne Parish, the company made location for LaTerre Land Company 1, C NW SW 31-19s-19e.

Below Choctaw Depth

Louisiana Crusader Oil Company is drilling Schwing 3 below the established 8270-foot producing horizon on the northwest flank at Choctaw, Iberville Parish. It is in shale at 8455 feet. From 8376 to 8388 feet and from 8389 to 8396 feet sand with a slight show of oil was encountered. The deep flank well has cored several sands with slight shows of oil.

Gulf Oil Corporation is completing Quarantine Bay QQ 4 at Quarantine Bay, Plaquemines Parish, drilled to 11,014 feet in shale. After making several tests up the hole, perforations at 8120 to 8149 feet, flowed 80 percent oil and 20 percent wash water at the end of the week through a 3/16-inch choke. Tubing pressure was 540 pounds and casing pressure 640 pounds.

Another 10,000-Foot Prospect

The Texas Company tested mud and distillate from a new sand at Lake Barre, Terrebonne Parish, last week and is running screen for a production test. If the well produces it will add another 10,000-foot producing field in South Louisiana. State Lake Barre 42 was drilled to 11,333 feet in salt, topped at 11,301 feet, the deepest salt in this area. Seven-inch casing was set at 11,333 feet and perforated from 10,460 to 10,507 feet. An eight minute drill stem test showed ½ joint of mud and 1½ joints of distillate. Also at Bay St. Elaine field, Terrebonne Parish, The Texas Company has logged a deeper sand in State Bay St. Elaine 18. The well blew out at 6811 feet in shale, making gas, oil and sand. The hole is being washed to bottom.

In St. Mary Parish, Charenton area, Edwars & Aber have made location for Catholic Church 1, 3650 feet northeasterly along the west line of Section 28 from the most southerly corner, thence 870 feet southeasterly at right angles in Section 28-13s-9e.

The Texas Company is down to the sand in Wax Bayou Company 1 at Bateman Lake in St. Mary Parish. The hole is bottomed at 10,866 feet in sand and shale. A gas sand was logged from 10,752 to 10,797 feet. An electrical logging device was run and the hole is being reamed. The Texas Company has another deep test drilling in St. Mary Parish, State Horseshoe Bayou 2 at Horseshoe Bay. At the end of the week the hole was down to 11,010 feet in shale and lime.

Herton Oil Company is making a production test of a new sand at Jeanerette, St. Mary Parish. Screen and liner is being set in Roanes Sugars 1-A after perforating casing with 35 holes from 9935 to 9960 feet. A 45-minute drill-stem test showed a 500-pound pressure, 297 joints of oil and 16 joints of salt water. The gravity was 38 degrees.

Union Sulphur Company is testing Miller 1 at Woodlawn, Jefferson Davis Parish. Casing was perforated with 14 holes from 8906½ to 8908½ feet and it came in flowing at the rate of 275 barrels of pipe line oil daily through a 3/16-inch choke, tubing pressure 2300 pounds, gravity 35.3 degrees. It later started making salt water.

SOUTH LOUISIANA Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
Choctaw—		
Standard of Louisiana, Morley Cypress Co. 1	904	8275
Jennings—		
Guaranty Oil Co., Rowson & Haber 1	150	3403
L. & L. Oil Co., Houssiere Latrielle 2	*	2430
Petroleum Heat & Power Co., Donnelly 1	*	3570
Iowa Jennings 1	*	3995
Iowa Jennings 2	*	2167
Smith 1	*	3873
Lake Long—		
Fohs, State 5	520	10236
New Iberia—		
Canal Oil Co., Sabatier 4	11	2315
William Helis, Schwing 6	318	5012
Texas Co., Duhe 8	435	5898
Quarantine Bay—		
Gulf, Orleans Levee Board District 1-A	390	8176
Starks—		
Lutcher Moore, Fee 5	*	4157
Tepetate—		
Continental, Fontenot-Ludeau-Tate 1	375	8998
West Hackberry—		
Gulf, Noble Fee 1	272	3215
Beauregard Parish—		
Humble, Powell Lbr. Co. 1, Kipling area, 25-3s-8w, core test	*	6350
Cameron Parish—		
Federal Royalty Co., State 1, Calcasieu Lake, 1-13s-9w	*	1661

*Failures; †Junked; ¶Million cu. ft. gas

NORTH LOUISIANA Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
Bossier (Bellevue)—		
Premier Inv. Co., Buckelew 3, 16-19n-11w	10	416
Caddo (Shreveport)—		
R. E. Allison, Ellerbe 2, 28-18n-14w	1680	5569
Caddo (Pine Island)—		
C. G. Gibbins, Helpman 1, 16-21n-16w	25	1008
J. T. Humphrey, Caddo Levee Bd. 2, 26-21n-16w	45	968
E. W. McGoldrick, Muslow 9, 32-21n-15w	10	1567
Madison (Wildcat)—		
Continental, Singer 1, 3-15n-11e	*	4345
Morehouse (Monroe)—		
Union Prod. Co., Tensas Delta 34, 33-22n-4e	¶3	2191
Fee 71, well 3, 27-21n-4e	¶3½	2170
Sabine (Zwolle)—		
H. L. Nutting, La. Longleaf 1, 24-7n-11w	35	2831
Richards & Holloway, Sabine 1, 7-7n-12w	*	2720
Hunter Co., Bowman-Hicks 7, 13-7n-13w	75	2544
Sabine (Blue Lake)—		
Albert Reich, Glaque 1, 27-7n-14w	*	4517
Union (Monroe)—		
Southern Carbon Co., Grayling 27, 20-22n-4e	¶3	2189
Grayling 28, 19-22n-4e	¶3	2200
Union Prod. Co., Fee 105, well 4, 8-21n-4e	¶6	2175

*Failures; †Junked; ¶Million cu. ft. gas.

North Louisiana Fields

New Shreveport area gets second oil well and first failure.

Negotiating for test to lower Marine just north of Lisbon.

Shreveport—With the second oil producer for the basal Glen Rose lime field in Caddo Parish adjacent to Shreveport completed last week in a ¼-mile west offset to the discovery well, the Shreveport field also recorded its first failure when F. W. Martin & Company and Superior Oil Corporation's Andrew Querbes 1, irregular Section 37-17n-13w, 6 miles southeast of the discovery well and diagonally southeast across the city limits, shut down at 6155 feet. This test checked low throughout, electrical log revealed, as compared to the discovery well and will be abandoned without a test unless decision is made to deepen to lower Marine. This decision will be made within one week. With elevation of 175 feet, derrick floor, it topped massive anhydrite at 4370 feet, 33 feet lower than Allison's Ellerbe 1, logged base of massive anhydrite at 4630 feet; lower anhydrite stringer at 4695-4732 feet; the Jetter horizon at 4802 to 4916 feet and topped Pettet (basal Glen Rose lime), at 5620 feet, or 71 feet lower than the same marker in the discovery well. Base of Pettet in Martin-Superior's test was 5674 feet and the transition zone or contact sand between Glen Rose and Travis Peak was logged from 5899 to 5915 feet with top of Travis Peak at 5957 feet, or 75 feet lower than the discovery well.

Five miles south of the discovery well, Hollywood Oil Corporation's C. & B. Realty Company 1, NE NE 22-17n-14w, was drilling at 4543 feet, after checking approximately 12 feet high on top of upper markers, with the following contact points: (elevation 208 feet) Nacatoch, 940 feet; chalk 1290 to 1746 feet; top of red beds, 2520 feet; Woodbine, with showing of gas, 2544 to 2560 feet. However, this test showed a thicker lime section where anhydrite stringers were logged than did the discovery well.

R. E. Allison's Ellerbe 2, SE NE 28-18n-14w, ¼-mile west of Allison's discovery well, was completed from 19 feet of saturated basal Glen Rose lime, at 5569 feet, flowing 62 barrels per hour through choke and gauging 1680 barrels in first 24 hours through ½-inch choke, with 0.5 percent of wash water showing. This test checked three feet lower on top of the Pettet than the discovery well. A half-mile south of this test, the same operator's State of Louisiana (77-acre tract) was drilling below 4744 feet in shale and streaks of lime after logging massive anhydrite from 4337 to 4599 feet, checking even with the discovery well. Three other tests in the Shreveport field are drilling.

East and southeast of Shreveport and in parts of Bossier and Caddo Parishes, The Texas Company continues to add to its holdings, last week having acquired several hundred acres in township 17 north, range 13 west. Gulf Refining Company continues to add to its holdings in township 22 north, range 14 west, Caddo Parish.

Magnolia Petroleum Company is negotiating with Union Producing Company for the oil rights on the latter's block north of Lisbon and around Section 13-21n-4w, for a proposed lower Marine test. Union Producing Company re-assembled the block after discovery of basal Glen Rose lime oil production at Lisbon, after having drilled Meadows 1, Section 13-21n-4w, to 6710 feet and abandoned it as a failure. This test has been seeping oil ever since abandonment.

Sibley-Sabine Oil Corporation last week announced location for a Glen Rose or Travis Peak test between the Dubberly Glen Rose gas-distillate field and the Bisteneau field, which produces wet gas from Glen Rose and Travis Peak. The new location is McDonald 1, NW NW 32-17n-9w, Webster Parish.

Gulf Refining Companuy has added 1200 acres to its block in east Richland Parish, in township 17 north, range 9 east. In township 23 north, range 6 east, Morehouse Parish, Union Producing Company has a seismograph unit at work. Shell Petroleum Corporation's seismograph working on the south end of the Sabine Uplift in Natchitoches Parish is now in township 7 north, range 7 west. Ohio Oil Company continues to lease in the southwest end of township 23 north, range 8 west, near the old shallow Haynesville field and Ohio Oil Company, Lion Oil Refining Company and Gulf Refining Company are leasing in township 23 north, range 9 west, near the old Shongaloo field, that has one deep gas-distillate producer. H. L. Hunt continues to secure leases around the edge of the Cotton Valley field. Magnolia Petroleum Company is leasing around Section 14-23n-10w.

On its geophysical prospect north of the old shallow Cartersville field, Magnolia Petroleum Company is coring hard sand below 7985 feet in Travis Peak.

Southeast of production on the Louisiana side of Rodessa, Idessa Oil and Gas Company (S. P. Borden) is reworking D. K. Sumner 1, SW SW 10-23n-15w, Caddo Parish, abandoned several months ago. Casing has been set and will be perforated at 6100-6140 feet to test producing possibilities of an oolitic lime in basal Glen Rose below the Rodessa producing zones.

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Magnolia—Houston

Arkansas Fields

Schuler widened westward; third well in at Village

El Dorado, Ark.—Indications were given last week of a ¼-mile west extension of the Schuler field in the Jones sand (lower Marine) in Jones, Murphy and Hurley's Murphy Land Company B-1, SWc SE NE 13-18-18, Union County, which was waiting on cement at 7684 feet, total depth 7700 feet. This test topped Jones sand at 7509 feet and topped the Permian (Reynolds) lime at 7610 feet, coring saturation in the Jones sand.

Schuler's Jones sand horizon added three wells during the last week to bring the total number producing from that horizon to 84. Twenty-two other tests are drilling in that field.

After many vicissitudes, Standard Oil Company of Louisiana last week successfully completed its second producing well in the Village district, Columbia County. It is the third Permian lime well for this field. The new producer is Tina Crumpler 1, C SW NW 15-17-19, which topped porous saturatel lime at 7380 feet; total depth is 7500 feet. The well when first perforated and tested showed a large amount of salt water. Squeeze job was done and a similar result occurred. This time the well was completed gauging 180 barrels of net oil in 24 hours flowing through 3/16-inch tubing choke with 10 percent additional salt water and 20 percent basic sediment. Casing pressure is 2450 pounds and tubing pressure, 850 pounds.

J. K. Wadley of Texarkana is assembling a block around Section 27-18-26, Miller County, six miles southwest of Fouke. Andrew V. Erwin has assigned about 1500 acres of his holdings in Lafayette County around Section 22-16-24, to Ohio Oil Company and Shell Petroleum Corporation which have holdings in this general area.

Along the Miller County line north of Texarkana where it borders the Bowie County, Texas line, Gulf Refining Company has a geaphysical unit recently brought in from Mississippi. Atlantic Refining Company continues to maintain a shooting unit in Township 15, range 19, Ouachita County near Stephens. Phillips Petroleum Company is expected to announce location soon on its geophysical prospect block near the old Mount Holly shallow field 12 miles southwest of Camden.

Joe Modisett, drilling contractor, has been awarded contract and is spudding a Permian lime wildcat test on a geophysical prospect for Fohs Oil Company and others at Union Sawmill Lumber Company 1, C SE NE 5-18-14, Union County, 5 miles southeast of El Dorado. Location is on a block of 5000 acres.

Although the price of Smackover crude was reduced only two cents per barrel to 73 cents last week in the reduction of Louisiana and Arkansas crude, inaugurated by Standard Oil Company of Louisiana, this old field, discovered in 1922, along with other stripper fields of Arkansas, is expected to suffer from the reduction and many old tests producing only a small amount of oil may be abandoned due to low price.

ARKANSAS Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
Union (Schuler)—		
Lion, Marine 4, 17-18-17	1080	7645
Phillips, Gan 2, 18-18-17	643	7701
Sewall 4, H. P. Sewall 4, 7-18-17	700	7709

*Failures; †Junked; ¶Million cu. ft. gas.

SOUTHEASTERN STATES Completions

MISSISSIPPI

Company, Well and Location	Init. Prod. Bbls.	Depth
Rankin (Jackson)—		
Love Pet. Co., Gulf States 2, 1-5n-1e	¶35	2360

*Failures; †Junked; ¶Million cu. ft. gas.

Jackson, Miss.—A block of approximately 9000 acres has been assembled by J. S. Butler, Trustee, of Quitman, Mississippi, centering around Section 29-2-14, Clarke County, east central Mississippi, for a proposed test to the Jackson and Claiborne formations, to start by November 15.

New Mexico Fields

Lease obligations keep drills busy despite proration. Shallow Vacuum well producing from brown lime section.

Hobbs, New Mexico.—Lea County is maintaining its position as an active drilling center through the starting of 14 tests the past week. New operations include 5 projects for the Vacuum field, 8 tests for the sandy-lime fields in the east portion of the county, and a wildcat in the Lovington area. Offset requirements and approaching lease expirations netted the Vacuum field the most new work, although the area is now experiencing pipe line proration.

Development of a shallow oil in the brown lime section for the Vacuum field was attained by Magnolia Petroleum Company's State 1-M, C NE NW 34-17s-35e, located in the east extension sector, with the hole bottomed at 3187 feet. The well flowed 48 barrels of oil in 1½ hours through tubing, natural, then quit. Oil shows were logged at 3085-90 feet, 3140-50 feet and 3162-71 feet, with an elevation of 3939 feet. Nine-inch pipe was cemented to make the production test.

Minor extension for the northeast flank of the older section of the Vacuum field was in process of completion the past week. Humble Oil & Refining Company's State 1-J, C SW SW 19-17s-35e, developed 1000 feet of oil after using 5000 gallons of acid at 4725 feet, with an elevation of 3996 feet. Magnolia Petroleum Company is rigging up for State 1-N, C C SW NW 19-17s-35e, half mile north of the latter test, which will be reacidized to try for flowing production.

Ohio Oil Company's State-Bridges 1, C NE NE 20-17s-34e, reported last week as a prospective 1¾-mile northwest extension, flowed 202 barrels initial on gas lift with 9 flow valves after using 8000 gallons of acid in regular lime pay at 4755 feet. The company has started operations on State-Warn 2, offsetting production on the south end of the field.

Southwest Outposts

Two outposts for the southwest edge of the field were included in the trio of new tests started by The Texas Company. State 1-V, NE NW 34-17s-34e, is the furthest removed from production, and State 1-U, C NE NE 2-18s-34e, is a diagonal offset to a well. The Texas Company's 8-O, C SW SW 36-17s-34e, flowed 192 barrels initial in 4 hours through tubing for completion at 4710 feet. The company's State 9-O, C SE SW 36-17s-34e, is a new operation, and was drilling at 1252 feet.

Helmerich & Payne-Continental Oil Company's State 1-G-36, C NW SW 36-17s-35e, wildcat on a trend between the Vacuum and Monument fields, was waiting nitro shot at 4950 feet. No increase in oil production was noted in deepening from 4920 feet, where the test swabbed a small volume of oil after acid treatment. The well swabbed 48 barrels in 24 hours prior to shot.

Pipe line proration was imposed upon Vacuum operators effective October 1 through The Texas-New Mexico Pipe Line Company having restricted its runs to 3000 barrels daily, although the allowable was set at 4235 barrels daily by the commission, or 55 barrels daily. Vacuum field was credited with 77 wells, according to tabulation by C. G. Staley, umpire. The cut was due to reduced nominations by crude purchasers, and also because of congestion developing on the pipe line outlet between Lynch and Jal stations.

The cut back at Vacuum was partially offset by the announcement that Shell Petroleum Corporation, effective October 1, resumed taking 100 percent of the allowable of Lea County wells served by Shell Pipe Line Corporation. Purchases had been held to 90 percent of the allowable since May 16, and on an 80 percent basis from April 10 to May 16. The state proration body ignored the cut and credited operators with back allowable, which can be made up when the market permits.

Production allowable for New Mexico effective October 1 was cut 2200 barrels to 103,800 barrels daily, according to the Oil Conservation Commission. Lea County's quota was reduced 2642 barrels to 97,488 barrels daily, while the Artesia district, Eddy County, regained a portion of its recently lost crude market outlet and was boosted from 4525 barrels to 4967 barrels daily. The top allowable per well in the latter district was increased from 32 to 36 barrels daily, while Lea County's top well allowable was cut from 57 to 55 barrels daily, with wells in the Vacuum

field being given credit for back allowable while restricted to 38½ barrels daily.

The Hardy area accounted for three new projects. Aloco Oil Company, a new entrant into Lea County, has started operations on J. N. Carson 1, C SW SE 28-21s-37e, on acreage farmed out by Gulf Oil Corporation et al. Magnolia Petroleum Company et al's C. Hardy 3, C NE NW 29-21s-37e, has rigged up. Location was made by Stanolind Oil & Gas Company for E. C. Hill 4-C, Lot 6, 5-21s-37e. In the Langlie field, Italo Petroleum Corporation of America is launching its first development in starting work on C. M. Carlson 1-B, SW SE SE 22-25s-37e, and Carlson 2-B, NE SW SE 22-25s-37e, both offsets to completed wells.

Expiration of lease term on 320 acres in the Mattix field was forestalled when J. M. Murray Trustee's E. D. Fanning 1, SE SW NW 33-23s-37e, spudded with machine on September 26. This tract was farmed out by Gulf Oil Corporation. The latter concern has started operations on J. R. Holt 1, C SW SE 16-24s-37e, which was required by offset drainage. Shell Petroleum Corporation's Grizzell 3, C SE SE 8-22s-37e, Penrose field, has landed surface pipe.

Lea County has been assigned a new wildcat project along a general northwest strike from the Hobbs field and 7 miles southeast of Lovington. Westmount Oil Company, Dallas, has contracted to drill State 1, C NW NE 12-17s-36e, on acreage farmed out by Amerada Petroleum Corporation. Location is 1¼ miles north by west of Western Drilling & Engineering Company's State 1, which showed free oil and nominal gas volume in the big lime, and was abandoned January, 1933, in sulphur water at 5215 feet. The showing made by this old wildcat induced operators to retain lease protection to the southeast of Lovington.

McKinley County's shallow oil pool registered one of its largest producers when the Petroleum Products Corporation's Santa Fe-Pacific Railroad 4, NE NE NW 1-17n-9w, pumped 122 barrels natural from the Dakota pay at 1540-1611 feet. It has an elevation of 6678 feet.

Shell Petroleum Corporation's Geo. Harwood 1, C S½ SE SE 27-7s-35e, south central Roosevelt County wildcat, landed 16-inch pipe at 288 feet, with an elevation of 4200 feet. Based upon the company's extensive geophysical data upon the area, a large structure prevails, and the drilling schedule calls for a deep test.

NEW MEXICO Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
Eddy County—		
Repollo, Beeson 3, se ne se 28-17s-30e	147	3268
Lea County (Hardy)—		
Continental, State 1-A-36, c se se 36-20s-37e	275	3845
Lea County (Langlie)—		
Phillips-Pure, Woolworth 3, c e½ se se 33-24s-37e	500	3525
Skelly, State 1-M, c sw sw 32-24s-37e	500	3560
Lea County (Maljamar)—		
Maljamar, Baish 11, c nw nw 22-17s-32e	75	4104
Lea County (Vacuum)—		
Texas Co., State 8-O, c sw sw 36-17s-34e	1152	4710
State 3-Q, c nw se 25-17s-34e	168	4725
Shell, State 1-E, c se sw 31-17s-35e	764	4690
McKinley County—		
Petroleum Prod. Corp., Santa Fe-Pacific Ry 4, ne ne nw 1-17n-9w	122	1611
San Juan County—		
Conoco, Rattlesnake 81, sw nw nw 1-29n-19w	30	870

*Failures; †Junked; ¶Million cu. ft. gas.

Illinois Developments

Richland County well flowing oil from Cypress sand.

Well at Olney city limits flows 25 barrels hour after acid.

Olney, Ill.—Pure Oil Company's F. Wakefield 1, Section 26-4n-9e, Northeast Noble Township, Richland County, promised a new Cypress sand pool when it started flowing by heads from a plugged-back depth of 2583 feet. It was the first sand well in Richland County and may be the first good one in the deep part of the Illinois Basin. The test had been carried to the lower McClosky lime where it failed to make a well. It had cored approximately 30 feet of Cypress. Indicated initial production is above 200 barrels daily.

The Texas Company's Dr. C. E. Harrolle 1, Section 27-4n-10e, Olney Township, Richland County, outpost in the North Olney field, which a week ago moved the field to the city limits, was given acid treatment last week and started flowing at 25 barrels an hour. First offset to be drilled is Wicklund Development Company's First National Bank of Olney 1, Section 34-4n-10e, just within the city limits. If the Wicklund and subsequent tests in the northern part of the city are successful, a town-lot drilling campaign within the residential section of the city is certain. Regulations limiting drilling to one well in a city block were adopted by the Olney city council several weeks ago.

The first McClosky completion in the Lake Centralia field of Marion County flowed 1011 barrels in its initial 24-hour test through tubing with a pressure of 800,000 cubic feet of gas. It is Kingwood Oil Company's Maxwell 1, Section 31-2n-2e. It topped the McClosky at 1870 feet and bottom-holed at 1902 feet.

Zephyr Oil Company's Langford 1, Section 33-2n-2e, east outpost in the Lake Centralia field, started flowing at 20 barrels an hour. This company's West Nation Church 1, Section 33-2n-2e, the field's north outpost, was coring above the Benoist.

While The Texas Company still dominates this field from the standpoint of completed wells and current operations, Magnolia Petroleum Company and Kingwood Oil Company have increased their activity in the area. Magnolia Petroleum Company had 8 tests drilling and Kingwood Oil Company 7.

Two Wells On Grave Plot

A deal was completed last week whereby two wells will be drilled on a cemetery lot 16 feet square not far from The Texas Company's Tate 1, Lake Centralia field discovery. The lease was acquired by Paxton Gray, Joe Murphy, J. L. Richardson and Joe Blalack, Centralia operators, for $1600 after Richardson toured nine states to obtain signatures of the O'Brien heirs, owners of the plot.

Surrounding acreage is owned by The Texas Company, which also obtained surface rights, thereby defeating a move of the independents to obtain ground for slush pits and drilling apparatus. The group hopes to overcome difficulties by sinking two wells with a core drilling machine, having a base of 12 feet by 12 feet, and will dig

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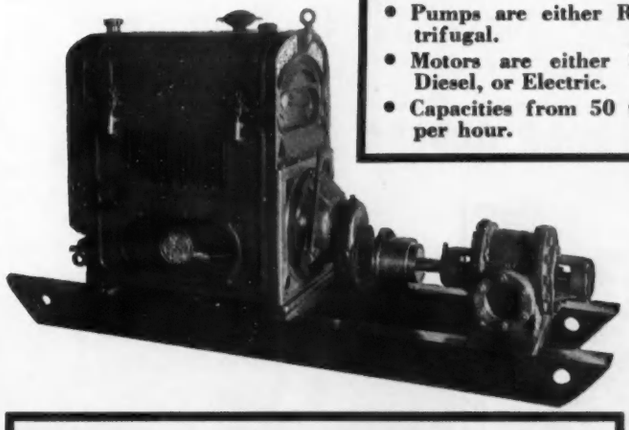

SOUTHERN

SOUTHERN ENGINE & PUMP COMPANY

HOUSTON, DALLAS AND KILGORE, TEXAS

slush pits beneath the derrick. Storage tanks will be erected on a concrete platform above the wells, one of which will be drilled to the Benoist sand and the other to the McClosky lime. Rights of egress and ingress have been obtained by the group, permitting them to move their equipment.

Thurman, Dunn & Petty's Suggs-Meeker 1, Section 11-2n-1e, wildcat near Odin, Marion County, was cleaning out a cave-in at 1462 feet after passing an oil showing in the Petro at 1402 feet and encountering another showing at 1451 feet. Another wildcat in this area, Boyce et al's Foster 1, Section 10-2n-1e, Odin Township, cored a dry Stein sand and was abandoned at 1703 feet.

In Lawrence County, Judy & Baldwin's W. F. Jennings 1, Section 2-4n-13w, Petty Township, cored 8 feet of saturation below 1880 feet. If successfully completed, it will open a new area for drilling.

ILLINOIS

Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
Champaign County—		
Nedra O&G Co., Block 1	*	480
Clay County—		
Pure, Duff 2A	982	3035
Bates 2	880	3025
Tetrick 6A	550	3007
J. Smith 1	509	3063
Smith 3	507	3001
B. Travis 4B	287	2997
Clinton County—		
Linier Oil Co., Trimmin 1	250	1387
J. F. Ryan, Brinkman 1	198	1383
Iroquois O&G Co., Blackburn 1	150	1382
W. C. McBride, Carson 3	140	1373
Crawford County—		
Salvage O&G Co., McGrillis 6	*	2885
Fayette County—		
Jarvis Bros., Sinclair 4	336	1477
Mize 4	250	1610
P. Doran, Goetting 2	240	1590
Goetting 1	91	1525
Cummings et al, Burtschi 2	210	1605
L. & G. Oil Co., Dial 1	200	1567
Minerva Oil Co., Tish 4	175	1525
Thayer et al, Morrison 1	175	1519
Morrison 2	84	1531
W. B. Johnson, Goetting 3	60	1545
Max Pray (DeKalb Syndicate) Buckmaster 1	*	1638
Binney et al, Baff 1	*	1650
Bell O&G Co., Sloan 1	*	1645
Marion County—		
Texas Co., Stonecipher 1	1135	1753
Williams 5	950	....
Richardson 1	125	....
Richland County—		
Sam Raitman, O'Donnell 1	200	3070
Washington County—		
E. C. Lang, Paul 1	*	1517
Schlafly et al, Brinkman 1	*	1715
Thompson Drlg. Co., Roznowski 1	*	1682
E. C. Phelps, Dodillet 1	*	1425

*Failures; †Junked; ¶Million cu. ft. gas.

Eastern States

Still another new field opened in Kentucky development.

Allegany area drilling at lowest level in many months.

Pittsburgh.—J. A. Shoemaker's E. O. Busby 1, ½-mile south of Hebbardsville, Kentucky, and 9 miles west of the center of operations in the booming Birk City field, encountered an unexpected Jett sand flow at 1400 feet last week to open a new Henderson County oil pool. Initial production was at the rate of 900 barrels a day, making it one of the largest Jett sand producing wells of the state.

Drillers late last week were working to shut off water coming in about 25 feet above the oil level, and to clean out a cave-in which slowed the flow of oil. A nearby pond was pumped dry to hold the initial flow. The well, intended for a test of the lower McClosky sand, was drilled with cable tools by Simmons Drilling Company.

A. S. Shaffer et al's Ed Bennett 1, a mile west of Utica, Daviess County, pumped 10 barrels an hour from the McClosky after being re-opened and treated with 1000 gallons of acid. This test, which had an oil showing in the McClosky when drilled 7 years ago, had been given a nitro-glycerine shot and abandoned. Treatment with an additional 3000 gallons of acid is to be given.

Carter Oil Company's O. Benham 1, in the recently-opened Gilmore pool of East Henderson County, Kentucky, started at the rate of 1200 barrels a day, having pumped 800 barrels during the first 16 hours. Bottom is at 1908 feet. The well is the fourth producer in the pool, and 5 locations have been announced for immediate drilling. A pump was being installed at Kentucky Natural Gas Company's W. Staples 1, which had 900 feet of oil standing in the hole and promises to be the field's fifth producer. B. & L. Drilling Company was past the 1800-foot mark on the Duncan Sisters tract, using a rotary.

In the Birk City field, W. E. Hupp et al's O. L. Boswell 3 started at 300 barrels a day after a shot in the Cuningham sand. Carter Oil Company was preparing to shoot Dempewolf 2 at 1270 feet after a test of the McClosky was unsuccessful. Gas is expected at the higher level.

Between the Niagara and Birk City pools of Henderson County, Imperial Oil & Gas Products Company's F. Mauzy 1, in the Cash Creek Section, started flowing at the rate of 180 barrels a day after a shot. Bottom is at 1610 feet in the Jett sand. It pumped

EASTERN FIELDS

Completions

OHIO

Company, Well and Location	Init. Prod. Bbls.	Depth
Athens County—		
A. D. Townsend, Hawk Hrs. 1	¶.50	....
Ohio F. G. Co., Sunday Creek 166	¶	1201
Nuzum, Pierce 1	*	1130
Kachelmacher et al, N. Y. Coal Co. 4	*	1042
Fairfield County—		
City Nat. Gas Works, Wagner 1	¶.10	2079
Guernsey County—		
Jewell et al, Gibson 1	*	1354
Holmes County—		
Bell Bros., Erb 1	¶	874
Knox County—		
Rubin et al, Bailey 1	50	3225
Licking County—		
Goodman et al, Moran 5	41	3025
St. Albans Dr. Co., Wright 1	2	765
Hoover Bros., Wells 2	¶.13	736
Rutledge & Mosholder, McArtor 1	¶	815
Stricker et al, Davis 1	*	587
Medina County—		
Baldwin, Wolf 3	*	205
Meigs County—		
Tyree et al, Decker 1	*	496
Monroe County—		
Geo. Vandergrift, Landefeld 1	¶	2017
Noble County—		
Barnsville Dev. Co., House 1	¶	....
Arick 1	¶	....
Perry County—		
Altier & Sons, Monahan 13	4	1047
Seneca County—		
Sun, Tiffin University 1	10	2035
Stark County—		
Lyons et al, Kachler 1	*	4507
Washington County—		
McTaggart Gas Co., McFarland 2	¶	1850
Burkhart O&G Co., Kendall 1	*	1445

WEST VIRGINIA

Company, Well and Location	Init. Prod. Bbls.	Depth
Boone County—		
Pure, Williams Coal 290	10	3062
Rich Fork O&G Co., Croft Land 9	¶.10	4122
Cabel County—		
Kingery et al, Beckett 1	¶.09	3038
Calhoun County—		
Hope Nat. Gas Co., Hardman 7819	¶1.43	1678
Kenny 7814	¶.33	2222
McCall Co., Bennett 1	¶.15	2055
Gilmer County—		
L. & W. Mossor, Riddle 1	¶1.00	1915
Kanawha County—		
Columbian Carbon Co., Castro 1	¶12.53	5092
United F. G. Co., Odell 4800	¶10.82	5100
Dawson et al 4803	¶6.98	5024
Lewis County—		
McCall Dr. Co., Davis 1	¶.95	1667
Pleasants County—		
Powell Oil Co., Powell 1	10	1850
Ritchie County—		
S. C. Morris, Cunningham 1	¶.04	1822
Roane County—		
Clendenin Gas Co., Fields 1	¶.25	1420
Wayne County—		
R. J. Petrie, Gibson 1	¶.33	3041
Wetzel County—		
Burgess & Wasmuth, Garner 1	¶.50	550

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120 barrels a day before the shot. This test opened a new pool a week ago.

Continued development in the Birk City field is bringing sharp increases in production of Henderson and Daviess counties. In Henderson County, crude production increased 24,167 barrels over July, bringing the August total to 106,821 barrels for which $135,678 was paid producers. Of August production, the Fordsville Gathering Lines, Inc., took 63,607 barrels, the Aetna Oil Service Company 36,871 barrels and Ohio Oil Company 6343 barrels. The Fordsville and Aetna companies are taking production in the Birk City and Gilmore pools, while Ohio Oil Company is taking production in the Niagara section.

A gain of 20,020 barrels was registered in August in Daviess County, bringing the month's total to 54,396 barrels for which the purchasing companies paid producers $44,539.94.

Indiana

Sun Oil Company's Murphy 2, Point Township, Posey County, Indiana, had water after the cement plug was drilled out last week at 1800 feet. Casing was being re-cemented in an effort to shut off the water, operators being uncertain whether the water comes from the formation showing oil saturation or a higher level. The company's Murphy 1 was nearing production depth, while the Murphy 3 was spudding.

L. J. Houze Glass Company's P. Dunham 1, important deep test in Springhill Township, Fayette County, Pennsylvania, resumed drilling last week after a short shutdown. Located on Chestnut Ridge, the test was at 7060 feet and believed to be in the shale directly above the Corniferous lime which overlies the Oriskany sand.

Pennsylvania

Updegraph et al's O. E. Erickson 1, wildcat in Elk Township, northeast Warren County, Pennsylvania, made an unsuccessful test of the Newburg sand and was abandoned last week at 5630 feet. A small volume of gas was encountered in that formation, but a shot of 200 quarts of glycerine failed to increase the flow. It was the first test of the Newburg sand in that area.

A further decline in drilling activity in the Allegany field was experienced during the past month, bringing operations to the lowest point in many months. Nineteen tests were underway by the following operators: A. C. A. Oil Corporation 1, Albert Oil Company 1, Bradley Producing Corporation 4, Ebenezer Oil Company 1, Ella Oil Corporation 1, Forest Oil Company 2, May Oil Company 1, New York Oil Company 1, Martin O'Connor Estate 1, Porge Oil Company 1, Sloan & Zook Company 2, Shamrod Oil Company 1, Swan Oil Company 1, and Wilson Oil Company 1.

KENTUCKY

Company, Well and Location	Init. Prod. Bbls.	Depth
Butler County—		
Evans et al, Brown 2	*	620
Hupp et al, Harrison 2	*	175
Smith et al, Arnold 2	*	174
Daviess County—		
Aetna Oil Service Corp., Morrison 2	400	1887
A. C. R. Oil Co., Duncan 1	400	1770
Hupp et al, L. Taylor 5	200	1886
Hunter 3	*	....
Major Oil Co., Peters 1	250	1863
Farmer & Chenault, Weaver 2	50	1204
Hancock County—		
J. C. Ellis, Smith 12	10	....
Henderson County—		
Carter, Dempewolf 3	235	1870
Aetna Oil Service Co., Dempewolf 2	450	1892
Lee County—		
South Penn Oil Co., Flahaven 111	2	798
Ohio County—		
A. Teller, Dickens 5	40	590
Leeper Oil Co., Ford 6	10	781
Hupp et al, Smith 2	*	....
Dehart, Eskridge 7	*	....

PENNSYLVANIA

Bradford District

N. V. V. Franchot, Mgr. Trustee, Harrington	5	....
D. E. Quinlan Estate, Fee	5	....
Lincoln & Brink, Connelly	1	....
T. H. Kervin, Jr., No. 2, Barry	1	....
W. J. Carmody, Zeliff	1	....
Forest Oil Corp., 3 wells	3	....
Niagara Oil Corp., 2 wells	2	....
Bradford Transit Co., 11 wells	11	....

Bradford: Water (Pressure) Wells

Quinlan Bros., Fee	...	....
Niagara Oil Corp., 2 wells	...	....

Butler-Armstrong District

J. M. Blair, J. M. Blair	1	....
F. A. & G. M. Reed, Edwards	1	....

Middle District

Clinger Oil & Gas Co., Clinger Oil & Gas Co.	1	....
Weaver Trust Estate, Charles Ditz	¶	....
S. Y. Ramage, Jr., Henderson	1	....

New York-Pennsylvania: Gas Fields

G. L. Cabot, Inc., Coral Cook	*	....
New York State Natural Gas Co., L. Dickerson	*	....
Evjen et al, Dusenberry	*	....

*Failures; †Junked; ¶Million cu. ft. gas.

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Rocky Mountain Fields

Lower Tensleep has good show at Mahoney Dome

Casper, Wyo.—Hole is being drilled ahead below 4820 feet in General Petroleum Corporation's State 1, NW NE SE 16-35n-77w, Cole Creek field, Natrona County, Wyoming. This is below the Shannon sand of the Frontier formation in which operators reported some shows of oil in cores around 4625 feet. A drill-stem test of the formation showed 17 stands of drilling fluid and very little oil or gas. Location is a mile north of the discovery well in the field, which is producing from the Lakota at 8013 feet.

Operations received a slight delay in the deep drilling campaign in the old Salt Creek field by Stanolind Oil & Gas Company. The company's Midwest Oil Company-TP 8, CNW SW 35-40n-79w, has drill pipe stuck at 3993 feet, in the Tensleep sand. Plans ar' to drill through the formation, set casing and complete by the selective method. Equipment then will be moved to Tensleep 29, CSW NW 35-40n-79w, original deep Tensleep well in the field, which is to be deepened from 3802 feet, in the top of the sand, through the formation for recompletion.

Good results were obtained on preliminary test of the lower sections of the Tensleep in Sinclair-Wyoming Oil Company's Mahoney 3, CSE NW 34-26n-88w, deep test in the Mahoney Dome field, in Carbon County, Wyoming. After a dissappointing test in the upper sections of the sand at 4408 feet, it cored to 4486 feet, still in saturation, where it swabbed and flowed 635 barrels of fluid while cleaning out. Storage is full and additional tankage is being built for further tests.

Operators are preparing to drill in at Sinclair-Wyoming Oil Company's Lost Soldier 79, SE NE NE 10-26n-90w, which bottoms at 1891 feet in the Sundance producing horizon of the Lost Soldier field, Sweetwater County. It will be drilled in with cable tools, rotary outfit used in drilling the well having been moved to Lost Soldier 80, NE NE NE 10-26n-90w, which is drilling at 605 feet. The company is drilling several Sundance wells in the area with a portable outfit, of which these two wells are the first to start.

Granite was topped at 7838 feet in Ohio Oil Company and California Company's William Kyle 3-A, SW NE 26-21n-79w, deep test in the jointly operated Big Medicine Bow field, Carbon County, and drilled to 7844 feet. With no oil shows reported below the Sundance, hole is being plugged back to the base of the first sand of this series at 5650 feet. It was a nominal producer in this sand before deepening.

Ohio Oil Company's Baker-Oil Springs 2-A, NWc SW SW 2-23n-79w, in the Oil Springs gas field in Carbon County, has been abandoned after finding water in the gas sand at 2717 feet, total depth, and operators are skidding rig about 400 feet north for a new hole.

MOUNTAIN STATES Completions

WYOMING

Company, Well and Location	Init. Prod. Bbls.	Depth
Weston County (Osage Field)—		
Bock & Jackson, Government 2, cnl nw nw 31-46n-63w	110	228
Taylor, Dodge & Pauley's 2, se nw nw 17-46n-63w	*	400

*Failures; †Junked; ¶Million cu. ft. gas.

GEORGE P. GRIFFIN, 40, assistant secretary and auditor of the Buffalo Oil Company, Dallas, died September 25. His body was forwarded to Tulsa, his former home, for burial.

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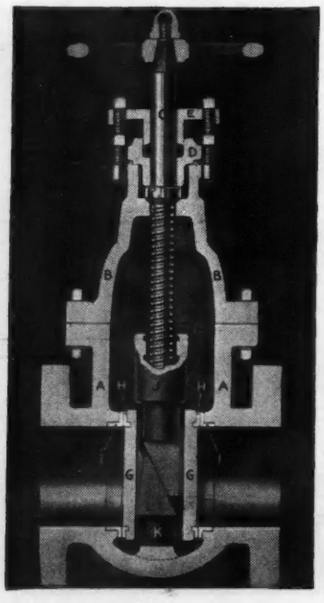

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Michigan Fields

Deeper sand makes good well in Freeman extension Van Buren County on verge of town lot drilling boom

Mt. Pleasant, Mich.—While hopes for a major east extension of the Freeman-Redding district, Clare County, was killed with failure of a Monroe lime test, the play gained momentum when deeper drilling boosted a north extension test from a near-failure to 776 barrels, under back pressure. Regarded as the biggest news for weeks in the district was the 5-foot deepening of Pure Oil Company's Switzer 1, Section 27-19n-6w, Redding Township, 2 miles north of the discovery well, and establishing of a second pay zone with flow production. Originally the test was completed at 3903 feet, with a water sand logged in the last few feet. Plugged back to 3900 feet, it was acidized four times without satisfactory results. The well produced from 5 to 20 barrels from this zone in the Monroe on swab and pump. Deepened to 3908 feet it flowed 136 barrels in 20 hours from a new pay and developed 776 barrels against 245 pounds back pressure the first 24 hours following acid treatment with 500 gallons.

Of less importance but also encouraging for the play was the establishing of flow oil production by Gulf Refining Company on Van Horn 2, Section 3-18n-6w, Freeman Township. Van Horn 2 is an east and south offset to wells with potentials between 1500 and 2500 barrels per day, one producing from a lime pay 4½ feet in Monroe and the other from a third pay 14½ feet in the Monroe. Van Horn 2 originally completed 9½ feet in the lime and was acidized three times with a top recovery of 99 barrels per day. It was deepened from 3885 to 3887 feet and started flowing. It is now rated an 1100-barrel producer.

Despite failures which have been drilled 1½ miles east, 2 south and 1½ west of the discovery well, the Freeman-Redding district continues to have a wide potentially productive area. Pure Oil Company's Switzer to the north appears to establish a field at least 2 miles north-south.

Introduce Rotaries

The first bona-fide Mid-Continent rotary for Michigan was spudded this week in the Freeman district, where a 600 to 700 foot glacial drift section, bad cave zones and water-gas areas have brought the biggest impetus for rotary drilling in the State. Parker Brothers of Tulsa have contracted with Gulf Refining Company to drill at least three tests. The first, Van Horn 4, Section 3-18n-6w, Clare County, will be rotated through the Marshall, approximately 1770 feet, and cased with 7-inch and then completed to the Monroe, 3900 feet, with cable tools. However, on a second test it is proposed to drill the entire 3900 feet with rotary. Three other rotaries are being used in the Clare district and are used only to the 6-inch casing point or approximately 1700-1800 feet.

Town lot drilling gained headway as

well as giving the state's shallowest oil producing pool a ¼-mile southwest extension when MR&T Oil Company's Murray 1, SE NE NE 17-1s-14w, Van Buren County, developed 450 barrels natural production from Traverse limestone at 1265 feet. It marked the first completion in the village of Bloomindale, where nine town-lot tests are active.

Half mile farther southeast, however, Smith Petroleum Company's Dickerson 1, SE NW SW 16-1s-14w, also a town-lot test, failed to show commercially in the Traverse and will be abandoned. This appeared to kill another block of town-lots ranging from 300 to 400 acres, where three other tests already had been spudded.

Gas Pipe Line Hearing

Hearings will be opened October 11 by the Michigan Public Utilities Commission on Producers Natural Gas Pipe Line Company's application for a permit to construct a 300-mile 10-14-inch gas line loop in Michigan. Application was originally filed in May, this year.

MICHIGAN
Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
Allegan County—		
O'Brien, Raber 1, sw sw se 36-2n-13w	*	1550
Gordon Oil Co., Bolks 1, sw se nw 28-3n-14w	*	1425
Leighton Oil Co., Wiggins 1, nw nw ne 15-4n-11w	*	1465
Heinig & Norton, Pushcel 1, sw sw se 23-3n-13w	*	1787
K. B. Montiegel, Smith 1, se ne nw 9-1n-12w	*	lcn.
Gordon Oil Co., Hoffman 1, se se ne 21-4n-14w	*	1510
Kolk 1, se sw ne 21-4n-14w	*	1550
Stewart & White, Oldebekking 4, se 21-4n-14w	200	1473
Freye 1, sw nw sw 22-4n-14w	630	1476
Swanson Oil Co., Hoffman 2, se ne se 21-4n-14w	135	1472
Muskegon Dev. Co., Dannenberg 1, ne ne ne 28-4n-14w	670	1479
Berens 3, sw nw se 36-4n-14w	110	1469
Crown Dev. Co., George 1, ne nw sw 21-4n-13w	40	1574
Cochran, Nineker 3, se sw nw 21-3n-14w	300	1570
Jetter Oil Co., M. E. Church 1, sw sw sw 31-3n-14w	*	1450
Wayland Synd., Kline 1, nw sw se 10-3n-11w	*	630
Arenac County—		
Weber Oil Co., Whiting 6, sw sw nw 11-20n-4e	10	2633
Clare County—		
Pure, Moore 1, ne nw nw 2-18n-6w	*	900
Dapar & Weller, White 1, nw ne nw 2-18n-6w	*	3953
Isabella County—		
Pure, Goodenough 1, se se ne 32-15n-6w	738	3644
Cornell 2, c s n nw 33-15n-6w	440	3716
Montcalm County—		
Rex Oil Co., Cheney 1, nw sw ne 11-9n-5w	*	3150
Shiawassee County—		
T. X. Buzzard, McCall 1, sw ne 11-6n-3e	*	1870
Van Buren County—		
E. P. Schelling, Debo 1, sw nw se 3-1s-14w	*	lcn.
Malow, Dickerson 1, sw nw sw 4-1s-14w	*	lcn.
Arthur Morris, Patrick 1, nw se nw 9-1s-14w	*	1261
Rex Oil Co., Williams 2, nw se se 9-1s-14w	100	1254
Holmes 1, nw ne ne 16-1s-14w	210	1255
Smith & Barkley, Dickerson 1, se nw sw 16-1s-14w	*	1306
Fisher & McCall, Wiggins 5, ne nw ne 16-1s-14w	150	1226
M R & T, Murray 1, se ne ne 17-1s-14w	450	1269
Gulf, Iodent 1, se se se 25-4s-15w	*	1111

*Failures; †Junked; ‡Million cu. ft. gas.

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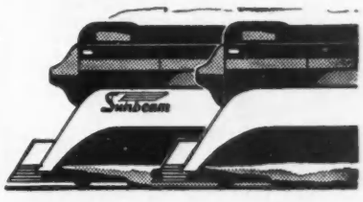

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9:10 P.M.—Ar.	DALLAS	Lv.—5:00 P.M.

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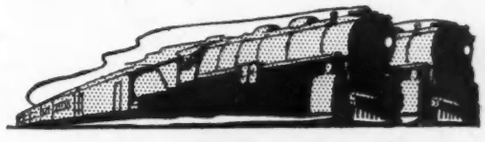
12:35 P.M.—Ar.	WACO (Bus)	Lv.—9:15 A.M.
2:00 P.M.—Ar.	DALLAS	Lv.—8:00 A.M.
3:00 P.M.—Ar.	*FT. WORTH	Lv.—6:50 A.M.

*Trains Nos. 82 and 83 between Ennis-Ft. Worth



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IMPORTANT WILDCAT TESTS

ARKANSAS

Calhoun—Samuel S. Alexander's Smythe 1, c ne ne 7-11-14, sd 2305 ft. C. E. Murdock's Southern Kraft 1, nw nw 17-14-13, dr 2850 ft. **Columbia**—Atlantic's Levi Garrett 1, c nw sw 13-17-20, dr 3640 ft. Petroleum Finance Co.'s Barnett 1, c nw se 14-17-20, rur. Standard of La.'s Tina Crumpler 1, 15-17-19, recompleted making 26 bbls fluid per hour 6 percent water, 35 percent b.s., old td 7500 ft. E. D. Harris 1, 15-17-19, rur. G. H. Vaughn's Levi Garrett 1, c se se 14-17-20, top James lime 3705 ft, dr 5543 ft. Tidewater & Seaboard's J. T. Beene 1, c se nw 15-18-19, elev 232 ft, Nacatoch 1973-91 ft, base chalk 2554 ft, top Tokio 3040 ft, dr 3120 ft, shale. **Craighead**—Tenn-Ark Inc.'s Martin 1, 35-14n-3e, ruct td 1754 ft. **Crittenden**—Stanley Oil Corp.'s D'Anner Hrs. 1, arr test, td 3351 ft. **Little River**—Barbere et al's Mills 1, se sw nw 18-12-29, rur. Clark et al's Strawn 1, sw se 20-10-32, woc 10-in csg 62 ft. Herzer et al's Smith 1, se se nw 4-13s-31w, dr 700 ft. **Lonoke**—J. F. Russell's Gunter 1, se se 17-5-10, sd 1650 ft. **Mississippi**—Benedum & Trees Oil Co.'s Winston Mack 1, nw sw 3-15n-12e, topped Nacatoch 2158 ft, dr 3259 ft. **Pulaski**—Coker Oil Corp.'s Stone 1, 36-3n-11w, sd 905 ft. A. L. Kitselman's Fee 2, se sw 2-1s-13w, sd 3389 ft. **Union**—Fohs Oil Co.'s Craig 1, se se ne 5-18-14, rur.

ALABAMA

Barbour — H. A. Stebbinger's Mrs. Alyce Robertson 1, 19-10-26, rur. **Choctaw**—Joe Modisett's McCorvey 1, se sw sw 20-9n-2w, owdd, td 7520 ft. **Greene**—R. T. Jeffrey et al's Lett 2, 3-20n-2e, sd 700 ft. **Lawrence**—Mid-Southern Pet. Co.'s Jacobs 1, sw se 11-7-7, ruct. **Mobile**—J. C. Prine's King 2, ne ne 4-1n-4w, sd 1120 ft.

CALIFORNIA

SOUTHERN

Los Angeles—Royal Land's No. 1, 8-4-17, co 1083 ft. Richfield's Dominguez Estate 1, 2-4-13, lcn. D.H.B. Oil's Heath 1, 34-3-11, dr sand and shale 5712 ft. John McKeon's Carmenita 1, 21-3-11, swabbing 8350 ft. Continental's Newhall 1, 20-4-17, grading roads. Newhall Drilling's Needham 4, 13-3-16, owdd 3505 ft. British American's Pico 1, 12-2-12, dr sand and shale 5775 ft. Tide Water Associated's Porter 1, 27-3-16, sdtr 4110, td 4225 ft. Texas Co.'s Anderson-Spring 1, 9-2-15, rur. R. T. Grady's Sepulveda 1, 23-5-14, rig. Hogan Petroleum's Burkhard 1, 7-5-13, dr 2500 ft. **Orange**—New Fields Oil's No. 1, 16-5-11, rur. A. V. Oil's No. 1, 16-6-10, redrilling 4634 ft. **San Bernardino**—Southern Counties Petroleum's Los Serranos 1, 22-2-8, dr sand and shale 1900 ft. **San Diego**—Dauphin Development's Irwin Kelly 1, 16-12-4, dr sand and shale 517 ft.

SAN JOAQUIN VALLEY

Fresno—Holly Development's No. 1, 12-20-15, lcn. Petroleum Securities' No. 88-7F, 7-20-16, wocs 632 ft; same, No. 31-18F, 18-20-16, dr sandy shale 4326 ft. Magnet's Fearon 2, 18-20-15, sd 4833 ft. Medford's F. C. Goetz 1, 10-20-15, dr siltstone 6716 ft. Shell's Coast Range 21, 17-19-15, dr siltstone 1160 ft. Standard's No. 82-13-C, 13-20-15, dr sandy siltstone 6706 ft. Stuart's Stuart 1, 12-21-14, dr blue shale 224 ft. Superior's Cagle 1, 6-20-16, lcn; same, Coalinga Fee 1, 7-20-16, dr shale 5748 ft; same, Hight 1, 8-20-16, sl 7999 ft. Texas Co.'s Mohawk 19, 12-20-15, bailed dry 4424 ft. Tide Water Associated's Fleishacker 57-1, 1-19-15, dr shale and sand 5230 ft; same, Guardian 66, 12-20-15, dr gray siltstone 6552 ft. Universal Consolidated's Leavitt-Hintze 1, 12-20-15, sd 5108 ft. Pure's S.P.L. Co. 1, 31-18-17, may abandon 12,336 ft. Dauphin Development's Ragan 1, 19-21-14, dr hard gray shale 3281 ft. Cyrus Pierce's Shorb 1, 16-14-12, dr blue clay 840 ft. **Kern**—Ohio's KCL A-8, 32-31-26, sd 11,186 ft; same, KCL F-1, 10-31-25, dr hard shale 8527 ft. California Lands' Salisbury 1, 7-29-24, dr sandy shale 5302 ft. Shell's KCL B-87-4, 4-30-25, dr sand and shale 4960 ft. Gibson's Alferitz 3, 14-25-18, oih streaks shale 1197 ft. G. W. Johnson's Brown-Paulette 1, 32-29-30, fsg 1175 ft. G. E. Renner's R.H.L. 2, 27-30-30, dr sandy shale 1596 ft. Richfield's Tupman-Western 1, 32-30-25, dr hard shale 8108 ft. Shell's KCL A-58-8, 8-27-26, lcn. Texas Co.'s Camp-West-Lowe 1, 7-29-27, redrilled 9724 ft, td 10,122 ft. Petrol's Reserve-Petrol 33-5, 33-11-19, dr conglomerate 5236 ft. Hall-Baker's Reserve 33-2, 33-11-19, bailing sand 4615 ft. Richfield's KCL 1, 28-11-20, dr silt and claystone 7212 ft. Wilshire's Tejon 34-1, 34-11-19, rig. C. C. White's Armstrong 2, 9-26-26, rig. Desert Glow's No. 3, 14-27-27, rig. Framac's Claflin 2, 22-27-27, co 1355 ft. Julius Freid's No. 1, 34-32-24, dr sand and shale 1810 ft. General Petroleum's St. Helen's 2, 12-28-20, lcn. Little & Gilstrap's Keating 1, 20-27-27, swabbing 2046 ft. Continental's KCL E-1, 17-30-26, m 8574 ft. Richfield's Union Avenue 1, 6-30-28, dr gray siltstone 6146 ft. Continental's KCL A-3-8, 8-27-24, dr gray sand 13,601 ft. Continental's Seaboard-Associated KCL-C-1, 26-27-24, dr hard shale 12,929 ft. Standard's Mushrush 1, 7-27-24, dr sandy shale streaks sand 11,931 ft; same, KCL 8-B-1, 17-27-24, dr hard brown shale streaks fine sand showing cut 13,040 ft. **Kings**—Caminol's A.O.G. 3, 29-24-24, dr hard shale 9505 ft.

COASTAL

Santa Barbara—Standard's Los Flores 1, 27-9-33, si 6556 ft. Richfield's Tinaquaic 1, 36-9-32, rig. Barnsdall's Pezzoni 1, 15-8-32, dr brown shale so & g 3512 ft. Petrol's Magenheimer 5-11, 9-8-32, co 4714 ft. J. E. O'Donnell's Helen 1, 8-7-33, dr hard brown shale 4710 ft. Continental's La Laguna 2, 25-8-31, rur. General Petroleum's La Laguna 1, 6-7-30, dr 500 ft. **Santa Barbara Mesa**—Anacapa Oil's No. 1, preparing to gun perforate. Trans-Oceanic Oil's Mdivani 1, dr 1615 ft. **San Luis Obispo**—G. E. Renner's R.H.L., 7-32-22, lcn. Temblor Oil's Temblor 1, 22-31-21, co 3091 ft. Loma Grande's Luis 1, 28-31-13, wocs 1476 ft. Hancock's Scherer-Dickes 1, 30-12-33, pumped trace of oil 5593 ft. **Ventura**—High Mesa's Butcher 1, 16-4-22, dr shale 1729 ft. Commander's No. 7-F, 13-4-19, redrilled 550 ft, td 575 ft. Charles R. McKinnis' Cosley 1, 14-4-19, co 965 ft. Merchants' Cochrane 8, 1-4-20, dr shale 1200 ft. St. Louis' Williamson 1, 1-4-20, dr red shale 605 ft. Texas Co.'s Shiells 135, 4-3-19, dr shale oih 3553 ft. Albatross' Scheiferle 1, 17-3-20, rig. Clipper's Calco 1, 17-30-20, rig. Section 20's No. 1, 20-5-19, dr shale 2153 ft. Hardison & Temple's No. 1, 22-4-21, wocs 565 ft. J. W. Martin's Arnett 1, 15-4-21, fsg cable tools 1230 ft. Stallings, Senter & Ahlburg's Stallings 1, 24-4-21, rigging pump 1445 ft. Ventura Drilling's Canet 1, 10-3-23, dr sand and shale 810 ft.

ABBREVIATIONS

The following abbreviations, signs, etc., are used in completions and wildcat reports in THE OIL WEEKLY.

*—*dry hole abandoned well.*	owdd—*old well drilling deeper.*
‡—*salt water (completions).*	owpb—*old well plugging back.*
†—*junked and abandoned.*	pb—*plugged back or plugging back.*
¶—*million feet of gas.*	r—*reaming.*
abd—*abandoned.*	rog—*rig on the ground.*
bbls.—*barrels.*	rur—*rigging up rotary tools.*
br—*building rig.*	rust—*rigging up standard tools.*
bs—*basic sediment.*	sd—*shut down.*
csg—*casing.*	sdtr—*sidetracking.*
co—*cleaning out.*	sg—*show gas.*
dd—*drilling deeper.*	si—*shut in.*
dk—*derrick.*	so—*show oil.*
dr—*drilling.*	so&g—*show oil and gas.*
fsg—*fishing.*	spd—*spudding.*
ft—*feet.*	sr—*straight reaming.*
hfw—*hole full of water.*	sw—*salt water.*
in—*inches.*	td—*total depth.*
lcn—*location.*	ur—*underreaming.*
m—*milling.*	wih—*water in the hole.*
mim—*moving in materials.*	wo—*workover.*
mit—*moving in tools.*	wocs—*waiting on cement to set.*
mot—*milling on tools.*	wosr—*waiting on standard rig.*
n, s, e, w—*north, south, east, west.*	
oih—*oil in hole.*	

COLORADO

Elbert—Plymouth Oil Co.'s Brosky-Union Pacific 1, csw sw 19-10s-60w, dr 5955 ft. **Garfield**—Roaring Fork Oil Co.'s Patterson 1, sw ne ne 36-7s-88w, wo csg, td at 1673 ft. **La Plata**—Nick Spatter's Bryce 1, se sw sw 31-33n-9w, sd 1862-65 ft, will run 8¼ in csg. **Mesa**—Continental Oil Co, California Co. & Amerada Petroleum Corp.'s Miller 1, sw sw nw 36-8s-91w, dr 8294 ft. **Moffat**—Isenberg, Parker & Myers' Myers-State 1, nw se ne 36-4n-103w, mim. Mackinnie Oil & Drilling Co.'s Coles 1, se nw se 1-3n-92w, dr 2940 ft. C. R. Privett's Government 1, ne sw 1-5n-96w, dr 735 ft. **Pitkin**—Glenco Development Corporation's Government 1, nw nw nw 9-10s-89w, sd 2805 ft. **Park**—South Park Oil Co.'s Lemarr 1, ne ne se 34-11s-75w, dr. 6275 ft **Prowers**—Continental Oil Co.'s Ruby 1, cne nw 31-21s-44w, dr 5425 ft. **Pueblo**—Ed Puckett, Barber 1, se nw 35-21s-66w, dr 812 ft. Eden Oil & Gas Co.'s Horse Creek Land & Cattle Co. 1, sw se 29-19s-64w, sd 1670 ft for repairs. **Rio Blanco**—Buford Oil Co.'s Government 1, cne ne 20-1n-91w, sd repairs 3185 ft. **Routt**—Moore, Craig et al's Irwin 1-X, csw ne 33-7n-85w, woc 12½ in csg 160 ft. Mid-Colorado Petroleum Co.'s Omholt 1, ne ne se 29-4n-87w, sd 3150 ft. Steamboat Springs Drilling Syndicate's Brown 1, nw ne 1-6n-86w, running 8¼ in csg to set at 1389 ft td.

KANSAS

Barton—Continental et al's Pichner 1, se nw 23-16-11w, dr 2930 ft. Carlock et al's Demel 1, ne nw 36-17-13w, rng csg 2767 ft. Lont et al's Eveleigh 1, sw ne 3-18-14w, dr 1950 ft. **Butler**—Phillips' Hanshaw 1, ne ne se 32-27-3e, dr 2620 ft. Stewart et al's Semisch 1, nw se 34-27-7e, ru. Solomon et al's Sawyer 1, sw nw sw 2-28-7e, sd 175 ft. **Cowley**—Gralap et al's Clark 1, nw ne 11-31-3e, sd 3175 ft. Henderson's King 1, nec 22-31-4e, ru. Barnsdall's Elliott 1, nec 5-31-5e, dr 2755 ft. Gralap et al's Community 1, nec 23-32-5e, dr 1345 ft. **Greenwood**—Dunlap's Warren 1, nw sw 4-28-10e, sd 2000 ft. **Marion**—Johnson et al's Miltz 1, swc 24-17-4e, sd 2275 ft. Cox et al's Jolliffe 1, c s½ sw se 2-22-5e, spd. **McPherson**—Western Kansas et al's Union 1, ne ne sw 18-17-1w, dr 450 ft. Marylyn's Dixon 1, nw ne nw 7-19-2w, dr 2610 ft. **Meade**—Cragin et al's Adams 1, nw nw se 22-34-30w, ru. **Ottawa**—Babcock's Copeman 1, c nl s½ s½ ne 7-10-2w, rng csg, td 2427 ft. **Pottawatomie**—Turner et al's Unshide 1, c ne nw 32-8-9e, sd 1150 ft. **Reno**—Carden's Strickler 1, nwc 17-22-6w, ru. **Rice**—Murfin et al's Birzer 1, ne sw 21-19-11w, sd 575 ft. Climax et al's Malone 1, se sw nw 36-20-10w, dr 1765 ft. **Rooks**—Shindheim et al's Dorr 1, se sw 13-9-16w, show oil, acidizing, td 3614 ft, pb 3350 ft. **Russell**—Price et al's Polcyn 1, swc 31-13-15w, rig. Yankey et al's Krog 1, nw se nw 7-15-13w, dr 310 ft. Western Kansas' Schneider 1, ne nw 35-15-14w, ru. **Sedgwick**—Hudson et al's Fulton 1, ne se 35-28-1e, sd 2355 ft. Crowe et al's Murphy 1, sw se 34-29-1w, rng csg, td 1725 ft. **Shawnee**—McKnabb's Fritz 1, sw se nw 4-12-14e, ru. **Sumner**—Cameron et al's Frey 1, nwc 3-30-1e, sd 90 ft. Vickers' Blue 1, n nl nw nw 1-33-2w, dr 2450 ft. **Thomas**—Ramsey et al's Ryan 1, c ne se 27-8-32w, dr 4950 ft. **Woodson**—Fleming et al's Central Life 1, swc 27-24-15e, sd 1560 ft. Nathan et al's Hassenpflug 1, nec 2-28-14e, ru.

SOUTH LOUISIANA

Acadia—Atlantic's Klump 1, ne of Tepetate, 12-7s-2w, woc 8705 ft. **Avoyelles**—Magnolia's Bowden 1, Evergreen area, 7-2s-4e,

dr sand and shale 6834 ft. **Calcasieu**—Sun's Lutcher Moore 2, Luntia area, 12-8s-13w, dr shale 7900 ft. **Cameron**—Federal Royalty Co.'s State 1, Calcasieu Lake, 1-13s-9w, abn 1661 ft. Humble's Hanszen 2, Chalkley area, 9-12s-6w, dr shale 11,649 ft. Union Sulphur's Miami Corp. 3, Willow Lake, 33-12s-8w, dr shale 9879 ft. **Iberia**—Texas Co.'s State 5, Fausse Point, 35-11s-8e, ru. **Jeff Davis**—Continental's J. Sturdivant 1, So. Roanoke, 36-10s-4w, preparing to test 12,088 ft. **Lafourche**—Texas Co.'s La. Terre 1, Golden Meadows, 1-20s-21e, running an electrical logging device 11,132 ft; same operator's State Catfish Lake, Golden Meadows, 77-19s-21e, lcn. **Orleans**—W. T. Burton's State 1, Lake Ponchartrain, 10s-13e, dr shale 8080 ft; same operator's Faubourgde Monteluzin B-2, Lake Ponchartrain, 11s-13e, dr shale 7309 ft. **St. John The Baptiste**—Shell's Godchaux Sugars 1, La Place, 97-11s-7e, dr shale 10,598 ft. **St. Landry**—Herton's Thistlewaite Lbr. Co. 1, Beggs area, 60-4s-4e, dr shale 9400 ft. **St. Martin**—Texas Co.'s St. Martin Land Co. 11, Henderson, 21-8s-7e, running geophones 8917 ft; same operator's State 6, Lake Mongouloui, 10-10s-9e, dr shale 9346 ft. Shell's Bourdin 1, West Lake Verrett, 15-14s-12e, dr shale 7509 ft. **Terrebonne**—Shell's Peters 1, se of Houma 73-18s-18e, dr shale 10,622 ft. Texas Co.'s Continental Land & Fur Co. 1, Lake De Cade area, 29-18s-14e, dr shale 8167 ft. **Vermilion**—Stanolind's Stovall 2, Intra-Coastal City block, 88-14s-3w, ru.

NORTH LOUISIANA

Bienville—Producers O&G Co.'s (Hall et al) Graves & Thomas 1, se sw se 23-15n-10w, woc 12½ in csg 179 ft. **Caddo**—F. W. Martin & Superior Oil Corp.'s Andrew Querbes 1, 37-17n-13w, sd 6155 ft may deepen to lower Marine. R. E. Allison et al's Ellerbe 2, 28-18n-14w, completed flowing 62 bbls oil per hour ½ in tubing choke, td 5569 ft. J. Thomas Driscoll, Inc.'s Woolworth 1, 19-18n-14w, rur. R. L. Bauman's Slattery Est. 1, 35-18n-14w, blew out making gas at 2550 ft. Pipe hung arr sdtr td 2550 ft. Oils, Inc.'s Cazaux 1, 10-16n-13w, sd for heavier rig 3502 ft. R. E. Allison's State 1, se se 28-18n-14w, elev 175 ft top massive anhydrite 4337 ft dr 4609 ft shale strks anhydrite. Hollywood Oil Corp's C. & B. Realty Co. 1, c ne ne 22-17n-14w, elev 208 ft, dr 4286 ft shale and strks anhydrite. Hall & Smith's Fee 1, se ne 5-17n-14w, lcn. Rodessa O&G Co.'s Chandler 1, 34-18n-14w, woc 222 ft. J. Weil's Dreyfuss 1, 20-18n-14w, lcn. Woolworth 1, 20-18n-14w, lcn. R. O. Carter et al's Marks Meyer 1, 34-18n-14w, lcn. J. T. Parks et al's Grayson 1, se se 30-19n-15w, rur. **Caldwell**—Oakes et al's Kles 1, ne sw ne 18-11n-3e, sd 470 ft. **Catahoula**—Sibley-Sabine Oil Co.'s Peck 1, 36-10n-8e, sd 2020 ft. **Claiborne**—E. T. Oakes et al's E. C. Kilgore 2, nw se 28-21n-5w, rur. **De Soto**—Samuel S. Alexander's Stell A-1, ne ne 5-12n-16w, coring so 2748 ft. A. L. Sutton et al's Frost Lbr. Co. 1, ne se 35-11n-15w, spd & sd. **Grant Parish**—C. R. Bower's Harrison 1, sw ne 21-8n-5w, cored Sparta 880-2 ft, dr 3675 ft. **Natchitoches**—J. E. Popkins' Peavy-Wilson Lbr. Co. 1, 36-7n-9w, sd 300 ft. **Red River**—J. M. Forgatson's J. G. Marston 1, se se 30-14n-10w, sg and so in Nacatoch, arr set 7 in csg td 1074 ft. **Sabine**—W. L. McClanahan's Frost Lbr. Co. 1, 22-9n-13w, acidized sd at 1616 ft old td 5709 ft. LeGrande et al's Tatum 1, nw ne 17-8n-13w, so in chalk running liner to test 2340 ft. Tropical Oil Co.'s Long-Bell 1, 5-8n-13w, arr deepen 3507 ft. Zwolle Synd's (Moffitt et al) Mansfield Hdw. Lbr. Co. 1, ne ne 8-7n-14w, testing 3740-70 ft old td 4325 ft. Geo. L. Pace's Logan 3, sw nw 26-10-13, testing td 1952 ft. **Webster**—Magnolia's Pardee C-1, c nw ne 17-23n-11w, swabbed dry, little oil at 6025 ft top Travis Peak 6054 ft, dr 7958 ft, hd sand and shale. Magnolia's Branton 1, 6-22n-9w, rur. Sibley-Sabine Oil Corp.'s McDonald 1, c nw nw 31-17n-9w, lcn.

MICHIGAN

Allegan—Oil Co., Inc.'s Godfrey 1, 17-2n-13w, lcn. Hilliard's Rankin 1, 10-1n-11w, lcn. Varner's Vanderkelk 1, 21-3n-12w, dr 1190 ft. Haze & McGill'sSlenk 1, 13-4n-16w, rig. Rex's Nelson 1, 36-1n-15w, rig. Leighton's Smith 1, 9-4n-11w, lcn. McClanahan's Johnson 1, 3-2n-11w, rig. Shimmel's Saugatuck 1, 28-3n-15w, dr 360 ft. O'Brien's Jewell 1, 15-1n-12w, dr 680 ft. V. Leonard's Koning 1, 35-3n-16w, Traverse lime 1310 ft, so 1342 ft, dr 1399 ft. **Arenac**—McHugh's Stevens 1, 8-19n-5e, sd 1683 ft. Bartlett's Clement 1, 6-18n-4e, dr 210 ft. **Barry**—Collin's Simmons 1, 3-4n-10w, dr 1830 ft. **Bay**—American's Hecht 1, 10-15n-3e, dr 1600 ft. **Calhoun**—Mar Cal's Woods 1, 13-2s-6w, rig. Verona's Fruin 1, 29-1s-7w, 8-in csg 2100 ft. **Clinton**—McDonald's Koeppen 1, 19-6n-3w, dr 1510 ft. **Gladwin**—Sun's Reid 1, 18-19n-2w, dr 2100 ft. Bridger's State 1, 29-19n-2e, rig. **Gratiot**—Chartier's Duffo 1, 6-9n-3w, dr 2100 ft. Michigan Chemical's Fee 9, 24-12n-3w, dr 4445 ft. **Huron**—Leonard Prospecting's Milling Co. 1, 10-16n-15e, dr 3180 ft. **Isabella**—Keeler & Mitchell's Stevens 1, 13-16n-6w, dr 2990 ft. Gulf's Houck 1, 13-15n-5w, br. **Kent**—MacCallum's Story 1, 32-7n-12w. Traverse 1865-72 ft, so 1872-88 ft, td 1992 ft, testing. **Lake**—Drury's Rice 1, 25-8n-12w, Dundee 3340 ft, sd 3381 ft. **Lapeer**—Hether's Foster 1, 26-9n-12e, Dundee 2140 ft, dr 2444 ft. **Mackinac**—Van Kuren's Hiawatha 2, 27-44n-9w, sd 610 ft. **Midland**—Andrews & Walter's Harris 1, 14-16n-1e, lcn, Weller & Dapar's Hepinstall 1, 9-13n-2e, br. Fortney's Sias 1, 19-14n-2e, dr 200 ft. Stork's Steger 1, 23-15n-2e, fsg 1315 ft. **Missaukee**—Teater's Campbell 1, 10-22n-5w, rig. Moser's Scherenheim 1, 36-23n-7w, sd 1415 ft. **Ogemaw**—Pure's State D1, 5-23n-2e, sd 2890 ft. Molloy's Morrison 1, 29-23n-3e, rig. Caldwell's State 9, 6-21n-3e, mog. **Osceola**—Fortney's Beall 1, 25-18n-9w, dr 1690 ft. Champion's Ealy 1, 30-20n-8w, dr 750 ft. **Otsego**—Summer's Geraldine 1, 28-30n-3w, fsg 860 ft. **Ottawa**—Sommerville's Bowman 1, 19-7n-14w, sd 1730 ft. **Roscommon**—Kirkham's Miller 2, 6-22n-2w, sd 3770 ft; Helen 1, 36-22n-2w, sd 3500 ft. **Van Buren**—Whitehill's Webster 1, 35-2s-16w, sd 1587 ft. Ogenauer's Vought 4, 32-4s-14w, lcn.

MISSISSIPPI

Claiborne — Claiborne County Dev. Co.'s Ruth Hayden 1, s½ se 55-11n-2e, rur to deepen, td 2950 ft. **Calhoun**—L. C. Lucas' E. C. Boland 1, sw sw 9-22n-9e, dr 760 ft, hd gumbo. **George**—Ryan & Anderson's (was Cleve Love), J. J. Newman Lbr. Co. 2, c sw 9-1s-8w, top chalk 5481 ft, dr 6762 ft, hd lime. **Hinds**—Cleve Love et al's S. F. Johnson 1, ne se 29-6n-1w, dr 3740 ft, hd red shale. Southern Nat. Gas Co.'s Progressive Realty Co. 1, se sw 35-6n-4w, dr 7310 ft. G. Jeffrey's Gaddis Farms 1, nw se 26-7n-4w, sd 3448 ft. Wilcox. **Montgomery**—Dr. T. A. Chichester's Mitchell 1, se nw 30-20n-7e, dk. **Pontotoc**—Waldrop et al's Bray 1, se n½ sw 17-11s-1e, sd 288 ft. **Simpson**—Goodwill O&G Co.'s Berry 1, se sw 33-2n-4e, sd 2810 ft. Cleve Love et al's N. E. Garner 1, sw ne 1-10n-17w, spd and sd. **Wilkinson**—La. Crusader Oil Co., Inc.'s Miss-Wis L&T Co. 2, sw sw 35-4n-1w, rur. **Yalnbousha**—Acme Holding Co.'s S. D. Boyle 1, nw nw 33-25n-7e, elev 415 ft, dr 2765 ft, red and yellow sand. Chas. W. Crader's Jno. Bruce James 1, ne ne 24-11s-6w, spd.

MONTANA

Blaine—Montana Gas Corporation's Duncan 1, cnw se 6-32n-24e, dr 1550 ft. R. E. O'Keefe's Tetter 1, csl sw se 10-31n-18e, dr 860 ft. **Phillips**—Treasure State Oil Pool's Government 1, cse sw 2-24n-23e, dr 350 ft. **Yellowstone**—Signal Oil & Gas Co.'s Stoltenberg 1, ne ne sw 18-3n-23e, dr 4590 ft.

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OKLAHOMA

Atoka—Shelton et al's Lee 1, ne nw sw 4-2s-10e, sd 3500 ft. **Beckham**—Wagnor et al's McGee 1, ne ne se 26-8n-22w, show gas 1014-46 ft, sd. **Caddo**—Texas' Smith 1, c ne nw 2-5n-12w, dr 2550 ft. **Choctaw**—Ross et al's Hardy 1, se se nw 21-7s-15e, dr 1125 ft. **Cleveland**—Rucker et al's Norman 1 (owdd) 17-9n-2w, ru. Big Chief et al's Strategier 1, nw nw sw 26-9n-2w, dr 3550 ft. **Coal**—Carter et al's Mote 1, c ep sw nw 19-2n-9e, dr 7810 ft. **Comanche**—Eldridge et al's Aetna Life 1, se se sw 2-1n-10w, ur, td 1060 ft. **Cotton**—Turner et al's Collins 1, ne se ne 18-4s-10w, dr 650 ft. **Grady**—Carter et al's Smith 1, c se sw 25-5n-8w, dr 3610 ft. **Hughes**—Phillips' Moulder 1, se sw sw 1-6n-10e, ru. Doup et al's Bond 1, ne ne sw 7-7n-9e, dr 2010 ft. **Jackson**—Lippert et al's Howard 1, ne sw nw (owdd) 10-3n-19w, dr 1375 ft. **Kay**—Hamilton's Riddle 1, nwc 3-26n-4e, dr 560 ft. Crawrodt et al's Roehl 1, se se nw 34-27n-2w, co, td 420 ft. Atlantic's Watson 1, se se nw 28-28n-1w, lcn. Tide Water's Hockman 1, nw nw ne 19-28n-1w, dr 750 ft. Blowser et al, Randolph 1, ne ne sw 27-29n-1w, sd for tools, td 3535 ft. **Kiowa**—Hughes et al's Fultz 1, sec 10-6n-18w, woc, td 1130 ft. **Kingfisher**—Hollenbach et Hollenbach et al's Zerger 1, c se sw 5-18n-6w, dr 3515 ft. **Lincoln**—Ok-Tex's Black 1, sec 31-16n-6e, woc 3903 ft. **Logan**—Continental et al's Donahoe 1, nw sw 16-18n-2w, ru. **McClain**—Willines' Pearson 1, se sw ne 13-5n-3e, dr 650 ft. **Marshall**—Hughes' Vivvitoe 1, c se ne 11-5s-4e, sd 5960 ft. **Muskogee**—Garrett's Fuel 1, sw sw sw 22-14n-18e, dr 1410 ft. **Noble**—Hollenbach et al's Mathews 1, c sw nw 9-20n-1e, dr 4860 ft. **Oklahoma**—McClennan et al's Rodesney 1, c w sw ne 27-11n-2w, ru. **Pittsburgh**—Supreme's Stevenson 1, sw sw se 27-3n-12e, mir td 1300 ft. **Pottawatomie**—Pace et al's Riley 1, ne ne se 2-8n-3e, dr 5725 ft. Hall & Briscoe's Merkle 1, nw nw se 32-8n-5e, tst 4340 ft. **Seminole**—Rogers et al's Robinson 1, se sw sw se 36-8n-7e, co 3140 ft. **Tillman**—Smith's Hammel 2, ne nw nw 6-5s-15w, fsg, td 2380 ft. **Washita**—McWhirter's Fee 1, nw sw se 34-8n-19w, ru 2172 ft td. Koberg's Harms 1-a, c nw ne 6-10n-16w, rig. Continental's Proctor 1, c nw 28-10n-20w, dr 6670 ft.

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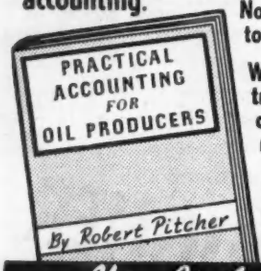

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EAST TEXAS BORDER COUNTIES

Cass—Bateman Drlg. Co.'s Jaynes 1, A. Douthette sur, sd 6505 ft (contract depth). **Marion**—Ark. Fuel Oil Co.'s Hussey 1, Chas. Lockhart sur, dr 5708 ft. Vestal et al's Moseley 1, D. Lane sur, sd 2768 ft. **Panola**—E. P. Pewitt et al's Rushing 1 (751-ac), Mannan Smith sur, lcn. Texas Co.'s Claude Adams 1, Thomas Cox sur, top lower Marine 7792 ft, top Permian salt 11,067 ft, hole cleaned to 11,000 ft, pb to 9100 ft, set 6⅝ in csg, arr perf and test in lower Marine, old td 11,303 ft Permian salt. **Sabine**—Hugo Allen's Brooks 1, Isaac Lowe sur, sdtr, td 5644 ft. **Shelby**—Grady H. Vaughn's Pickering Lbr. Co. 1, Brooks sur, rur. Redditt et al's Pickering Lbr. Co. 3, dr 800 ft.

WEST TEXAS

(This report is confined to the south and east portion of the Permian basin and the Delaware basin.)

Brewster—G. H. Storey et al's J. P. Wilson 1, c se nw T. & St. L. sec 3, blk 212, elev 3609 ft, td 2545 ft, dry and abd. H. D. Wilcox et al's W. H. Kokernot 1, nw sw sec 12, blk C, J. V. Massey sur, sd 1871 ft. **Coke**—Barnett Pet. Corp.'s J. E. Mims 1, sec T&P sec 39, blk W, elev 2352 ft, sd 1861 ft. J. W. Westbrook et al's Jim Rice 1, swc T&NO sec 18, lcn. **Crane**—Aloco Oil Co. (was Ardrey et al's) J. B. Tubb 1-a, near swc PSL sec 20, blk B-32, elev 2552 ft, top Yates 1490 ft, tested dry 4434 ft, dr 4477 ft. Gulf's M. B. McKnight 4, c ne se PSL sec 3, blk B-21, elev 2701 ft, ft, top Simpson lime 6160 ft, top Ellenberger 6543 ft, dry and abd 6558 ft; University Lassiter 2-B, swc sec 27, blk 30, elev 2596 ft, top anhydrite 1075 ft, top salt 1130 ft, pay 3097-3142 ft, shot 430 qts 3008-3135 ft, flowed 479 bbls 31.4° oil initial; W. N. Waddell 9, c ne ne PSL sec 7, blk B-27, elev 2545 ft, dr 2085 ft. Magnolia's University 1-6, sec sec 6, blk 30, top anhydrite 1135 ft, top salt 1205 ft, dr 2941 ft. **Crockett**—Black & Eubanks' University-Humble 2, sd 315 ft. Gilcrease Oil Co.'s University-Humble 1-G, nw nw sw sec 13, blk 14, lcn. **Culberson**—J. E. Fitz-Patrick et al's Wm. Cameron & Co. 1, c nw nw PSL sec 24, blk 81, sd 945 ft. P. W. Lewis et al's Niehaus 1, se se ne PSL sec 13, blk 109, elev 3955 ft, top Delaware lime 1178 ft, ur 2725 ft. H. J. W. Niehaus et al's C. M. Caldwell 1, se nw PSL sec 15, blk 109, elev 3878 ft, top Delaware lime 1165 ft, top sand 1215 ft, sd 2500 ft. L. G. Sheddan et al's S. J. Isaacs 1, center PSL sec 25, blk 52, sd 280 ft. **Jeff Davis**—H. F. Wilcox O&G Co.'s Jones-Coffield 1, nec H&TC sec 121, blk 4, elev 4537 ft, sd 3747 ft. **Ector**—Bert Fields-Ben Rogers' R. H. Speer-Owenwood 1, sw nw ne T&P sec 6, blk 44, T-2-S, elev 3205 ft, top anhydrite 1510 ft, top salt 1540 ft, top Yates 2810 ft, dr 4100 ft. Sinclair Prairie Oil Co.'s Paul Moss 2-B, swc T&P sec 40, blk 44, T-2-S, elev 3050 ft, top anhydrite 1390 ft, top lime 3570 ft, pay 3950-4002 ft, td 4177 ft, pumped 21 bbls 5 hrs after shot. **El Paso**—Tri-State Oil Co.'s Kinkel Bros. 1, nec sec 237, S. F. No. 7232, elev 3977 ft, sd 3571 ft. **Fisher**—Daube Bros. et al's R. S. Hardy 1, near c sw sw H&TC sec 43, blk 2, sd 3731 ft. Forest Dev. Corp.'s W. E. Morrow 1, c nw nw H&TC sec 48, blk 2, elev 2028 ft, dry and abd 4425 ft. Owens-Snebold Oil Corp.-A. C. Varner's J. H. Milsap 1, swc w½ ne H&TC sec 61, blk 1, elev 1901 ft, dry and abd 3590 ft. **Tom Green**—Spinner Oil Co.-H. L. Fannin's B. Reed 1, sub-div 39, Mayson-Perry sur, elev 1992 ft, fsh 5118 ft. B. C. Mann et al's Ike Funk 1, c e½ sw nw H&TC sec 39, blk 5, cem sur pipe. J. B. Watson et al's Llano 1, sec 16, Llano C.S.L. sur, sd 621 ft. **Howard**—S. S. Owens et al's D. S. Wright 1, nw se se T&P sec 33, blk 33, T-3-N, elev 2747 ft, sd 1375 ft. Ward Powell et al's Guitar 1, c ne sec 17, blk A, Bauer-Cockrell sur, elev 2508 ft, top anhydrite 1195 ft, top salt 1255 ft, sd 3394 ft. **Hudspeth**—Haymon Krupp Oil & Land Co.'s K. S. Briggs 1, nwc T&P sec 24, blk 73, Tsp. 7, elev 4016 ft, sd 4415 ft; S. J. Thaxton 1, near sec ne se T&P sec 34, blk 74, Tsp. 6, top gray lime 4580 ft, fsh 5133 ft. **Menard**—Lee Pet. Co.-C. D. Hagerty's Jas. Callan 1, swc e½ of J. M. Franz sur, sec 36, elev 2026 ft, trace gas 1267 ft, fsh 1270 ft. **Nolan**—P. G. Smith et al's E. E. Adrian 1, near c sw T&P sec 43, blk 20, lcn abd. Chas. E. Peddicord et al's C. H. Tipton 1, dr 1430 ft. Union Oil Co. (Nevada's) J. D. Pepper 1, nec T&P sec 57, blk 21, dr 1350 ft. **Pecos**—E. B. Carruth et al's J. R. Triplett 1, near c e line GC&SF sec 4, block 194, sd 30 ft. Cox & Moore's White-Baker 1, c sw se T. C. sec 43, blk Z, sd 1805 ft. Geo. J. Greer et al's Price Est. 1, nec H&GN sec 3, blk 12, elev 2279 ft, top brown lime 1454 ft, sd 1820 ft. J. N. Gregory et al's O'Neill-Humble 1-a, south cor n¼ H&GN sec 74, blk 10, elev 2435 ft, so 1642-52 ft, so&g 1668-74 ft, sd 1777 ft. W. W. Gruber et al's Mrs. H. H. Sanger 1, c nw T. & St. L. sec 10, blk 135, sp and sd. Helmerich & Payne, Inc.-Wright & McMillen's Dow Puckett 1, se se ne T&P sec 66, blk 3, dr 910 ft. Humble's A. H. Robertson 1, c nw ne T. C. Ry. sec 27, blk OW, dr 1960 ft. O. E. Schkade et al's Neville 1, GC&SF sec 72, blk 194, dr 310 ft. E. M. Thomasson Prod. Co.'s J. Nations 1, sec 1, blk 105, W. P. Howard sur, dr 385 ft. Stanley A. Thompson et al's Elsinore Cattle Co. 1, se se GC&SF sec 53, blk D, elev 2938 ft, cem by lost tools, td 7342 ft. Trans-Pecos Oil Co.'s F. M. Gallagher 1, ne ne nw T&P sec 9, blk 51, Tsp. 10, sd 2240 ft; Popham Land & Cattle Co. 1-B, s½ GH&SA sec 235, blk 11, (third hole), sd 2385 ft. Union Oil & Mining Co.'s First Nat'l Bank 1, near nec H&GN sec 6, blk 9, elev 2410 ft, sd 1760 ft. **Presidio**—Brite Production Co.'s L. C. Brite 1, ne¼ GH&SA sec 113, blk 12, sd 5427 ft. **Reagan**—Culbertson & Irwin, Inc.'s J. F. Nunn-Standard 1, c ne nw L&SV sec 26, blk B, elev 2668 ft, top anhydrite 1240 ft, top Yates 2010 ft, top lime 3180 ft, dry and abd in sul w 3456-57 ft. Thomas Drl. Co.-E. H. Van Patton's J. O. Carr-Sun 1, near c ne sec 4, H. N. Hines sur, elev 2638 ft, top lime 2450 ft, top Yates 1565 ft, dry and abd in sul w 2802-03 ft. John W. Emch et al's T. P. Land Trust 1, c n½ s½ sw T&P sec 203, blk 1, dr 460 ft. **Reeves**—H. F. Anthony & Lagoki Oil Co.'s Richards-Shaw 1, c n½ nw PSL sec 16, blk 59, fsh 1581 ft. Frankley & Rice's W. A. Tunstill 1, ne ne nw T&P sec 10, blk 56, Tsp. 2, elev 2906 ft, top Rustler 190 ft, base salt 3070 ft, top black lime 3254 ft, Delaware sand 3283-95 ft. est. 1,500,000 ft gas, sd for cas. Ohio Oil Co.'s Popham L&C Co. 1, nw T&P sec 18, blk 54, Tsp. 10, elev 3623 ft, dr 3990 ft. **Runnels**—John Castor, A. E. Koerner & H. B. Goodrich's J. C. Beddo 1, sub-div 41, D. Diaz sur, lcn. J. W. McLean et al's E. H. Pflueger 1, Asa Clark sur, A-506, sd 1645 ft. Stephenson & Jackson's W. J. Fowler 1, near ne ne sw E. T. Ry. sec 150, sd 1355 ft. **Schleicher**—Cooper Gas Co.'s Bert Page 2, c ne sw GH&SA sec 40, blk L, elev 2289 ft, tested 9,500,000 ft gas with distillate spray 5441-5501 ft. H. P. Opp et al's J. T. Jackson 1, nw ne T. C. Ry. sec 41, blk LL, elev 2353 ft, dr 495 ft. **Scurry**—H. H. Coffield & Guthrie, Inc.'s E. E. Spears 1, nw nw sw H&TC sec 130, blk 97, elev 2294 ft, top lime 1512 ft, pb fr 3543 to 2493 ft, shot 500 qts 2300-2425 ft, testing 2250 ft oih. P. G. Moran et al's F. W. Hardee 1, nwc H&TC sec 99, blk 97, sd 1000 ft. S. B. Roberts & Co.'s C. M. Wellborn

SALE OF OIL AND GAS LEASES—Department of the Interior, General Land Office, Washington, D. C. Notice is given that the following described lands and deposits of oil and gas therein contained are offered to the qualified bidder of the highest bonus per acre for leasing pursuant to section 17 of the leasing act of February 25, 1920 (41 Stat. 437), as amended by the act of August 21, 1935 (49 Stat. 674), at the royalty rate scale in the lease form shown in Circular 1386: Unit No. 1, the principal island, East Timbalier Island, known locally as Bird Island, located in fractional Secs. 34, 35, and 36, T. 23 S., R. 21 E., Secs. 2 and 3, T. 24 S., R. 21 E., and Sec. 31, T. 23 S., R. 22 E., Louisiana Meridian, situated on the Gulf Coast of La Fourche Parish, State of Louisiana, lying above the elevation of mean high tide, containing 295.77 acres, more or less. Unit No. 2, two islands, adjoining Unit No. 1 in a northeasterly direction between said principal island and Raccoon Pass, Island No. 1 located in fractional Sec. 31, and Island No. 2 located in fractional Sec. 32, both in T. 23 S., R. 22 E., Louisiana Meridian, situated on the Gulf Coast of La Fourche Parish, State of Louisiana, lying above the elevation of mean high tide, containing 11.69 and 69.29 acres, respectively, more or less. Sealed bids will be received in the office of the Secretary of the Interior up to 12:00 o'clock (noon), October 31, 1938. Bids must be submitted on each unit separately but both units, if awarded to the same bidder, may be included in a single lease. Each bidder must submit a certified or cashier's check or draft for 1/5 of the amount bid, payable to the order of the Secretary of the Interior, and furnish a showing of qualifications as required by section 7 of Circular 1386. The remaining 4/5, together with the annual rental at the rate of $1 per acre, must be paid by the successful bidder prior to the issuance of lease, and the deposits of other bidders will be returned. The envelopes should be marked plainly "Bid for Unit No.———(1 or 2), East Timbalier Area. Not to be opened before noon, October 31, 1938." The bidders are warned against violations of the provisions of Sec. 59 of the United States Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids in the discretion of the Secretary of the Interior. Protests by the State of Louisiana and others claiming under the State against the granting of Government leases for the group of islands on the ground that they are the property of the State were overruled by the Secretary of the Interior in a decision rendered July 29, 1938 (A. 21589), after an oral hearing at which the protestants were represented. The Secretary held that the United States has asserted ownership of and jurisdiction over East Timbalier Island for more than 100 years and that the group of islands are public lands of the United States. Commissioner, General Land Office.

1, c w½ sw H&TC sec 146, blk 25, elev 2380 ft, hfw and dry and abd 3035 ft. **Sterling**—J. W. Sward et al's T. G. Brennand 1, se se ne H&TC sec 107, blk 2, elev 2535 ft, top Yates 1028 ft, top brown lime 1746 ft, top solid lime 1820 ft, sd 3011 ft. **Stonewall**—General Crude Oil Co.'s J. D. Smith 1, sec H&TC sec 371, blk 2, elev 1958 ft, top Dothan 3530 ft, top Noodle Creek 3640 ft, top Saddle Creek 3813 ft, dr 5428 ft. Stonewall Oil Co.'s Ima Harrison 1, nw ne nw H&TC sec 294, blk D, lcn abd. **Sutton**—Geo. Irvin et al (was A. A. Basse-S. J. Sackett et al's) W. A. Miers 1, c ne TW&NG sec 54, blk 14, sp and sd. **Terrell**—Schermerhorn Oil Corp.'s H. P. Allison 1, c se¼ sec 22, blk B-2, CCSD&RGNG sur, elev 2649 ft, top Rustler 710 ft, top Blaine 1230 ft, hfw dry and abd 2500 ft. **Upton**—White & Wilson's M. B. Webb 1, sw se ne sec 176, blk E, CCSD&RGNG sur, sd 150 ft. **Ward**—J. E. Fitz-Patrick et al's F. I. Dyer 1, w¼ n¼ H&TC sec 135, blk 34, elev 2709 ft, base salt 3845 ft, top Delaware lime 5081 ft, sd 5085 ft. **Winkler**—Richardson Oils, Inc.'s J. M. Bashara 1-A, sw sw se PSL sec 22, blk 77, elev 2973 ft, base salt 2260 ft, run cas 3238 ft.

SOUTH TEXAS

SAN ANTONIO DISTRICT

Atascosa—R. C. Stanley, Tr.'s A. H. Schumann 1, Malone sur, dr 1365 ft, 1081½ ft. **Bastrop**—Ira Otha Brown's Bailey 1, Crutchfield, contract let. Franklin, Thaxton & Harrington 2, Bangs sur, sd 1893 ft. Tarver, Rivers 1, Burleson sur No. 59, dr 1600 ft. Teas, Ashley and Hinton, Grizzard 1, Graham league, td 7123 ft, ran dst 7088-7123 ft, rec 7 joints black rotten sul wtr 15 min, running another dst 7043-65 ft. **Bexar**—Blackburn, Miller 1, sur 324, coring 245 ft, oil and gas show in chalk. Johnston Brown 1, Christopher sur, No. 55, td 1375 ft, cleaning out after 1000 gals acid treatment. Noake, Oppenheimer 1, Miller sur, dr ahead 831 ft. Philtop, Patton 3, Rodriguez sur, td 1131½ ft, wo gauge. Ridder, Ridder 1, Barrera sur, lcn. **Blanco**—Johnson, Glasscock 1, sec 50, sd 500 ft. Nixon, Crist 1, sur 94, dr sh 965 ft. **Caldwell**—Tinkle, Blackwell 2, John Roe sur, td 2335 ft, pumping, wo gauge.— **Frio**—Humble, Schley 1, Travalder sur, td 5309 ft, dr plugs, ran tbg, swabbed, showed some gas, few heads oil, not cleaned, flowing in pits, making oil and mud considerable gas. **Guadalupe**—King, Rosenbrock 1-A, Duran sur, dr 1100 ft. Marosis, Maierhofer 3, Peters sur, dr below 700 ft. Marts & Beaven, Glenwinkle 1, Wakefield & Stewart sur, dr below 2100 ft. R. A. Williams et al, Weber 1, Torres sur, dr chalk 1259 ft. **Kendall**—Carpenter, Seidensticker 1, Rodriguez sur, sd 210 ft. Millican and Norman, Willie Werner 1, Torrey sur, td 1002 ft, testing. Herbert W. Reed, Marquart 1, Traviesso sur, td 645 ft, rec fish, prep dr ahead. **Kimble**—Plateau, Bolt 1, Jones sur 42, td 1900 ft, woc. Plateau, Davis 1, Mitchell sur 44, dr 250 ft. Plateau, Hunger 1, Dufner sur 43, dr by tools 1640 ft. **Lee**—Pederson, Brown 1, Hudson sur, dr below 4937 ft. **Maverick**—Humble & Wellington, Indio Cattle 1, Rivas Grant, dr 1502 ft. Cored Navarro sand with o show. 1425-29 ft, dst 1425-33 ft, ⅜ & ¾ in ch, rec 100 ft gas cut mud, 10 min. **Medina**—Gaston, Robers 1, Wilson sur, dr 798 ft. Killian, Crusteturner & Martin, Wiemers 1, Boder sur 51, dr below 1073 ft. Whitfield & Draper, Ulbrich 1, Hoffman sur, dr below 400 ft. **Travis**—Wolter, Johnson 2, Burleson sur, dr 300 ft. **Williamson**—Anderson, Teichelman et al 1, Jett sur, td 2471 ft, pulled pipe to sd/tr. **Wilson**—Stapper Pet. Co., McDaniel 1, Manchaca sur, dr ahead 3115 ft.

LAREDO DISTRICT

Duval—Cosner, Garcia 1, A.B.&.M. sur, coring below 4840 ft for Pettus, sand stringer with oil odor 4102-02½ ft, sw snd 4166-77 ft and 4194-4226 ft. Magnolia, Duval County Ranch, sec 48, mim. Stewart & Nye, Welder 1, Poitevent sur 312, td 1557 ft, testing sd 1546-57 ft, 7 in at 1543 ft. Thompson, Parr 1, Rogers sur 118, dt below 2030 ft. **Jim Hogg**—Humble Oil & Ref., Bass 3, San Rafael gr, ru **La Salle**—Lake-Tobian Oil Co., O'Conner Ranch 1, O'Connor ranch, td 200 ft, sd for dr pipe. **McMullen**—Barbara Oil Co., Edrington 1, A.B.&M. sur, mim and ru. Cosner & Clair, Nueces Land & Livestock 1, sec 177, td 1161 ft, cores oil sand 1156-61 ft, 5½ in at 1156 ft, woc. Ezzell, Fee 22, Ezzell, td 1535 ft, perf 1506-19, wo gauge. Scarborough and Biglane, Matulla 1, Garner sur, spud. Shumway and Burns, Shiner Ranch 2, Grist sur No. 4, prep spud. Spice, Edrington 1, A.B.&M. sur 57, td 2519 ft, testing on various chokes, flowed 20 bpd 22 grav oil through separator ½ and ⅝ in ch, tp 140, cp 280. **Starr**—Circle, Olivares 1, sur 241, dr below 475 ft. Graham, Gutierrez 1, Juris de Carmargo, td 2987 ft flowing est 2 mcf dry gas, tp 750, cp 900 ⅛ ch, perf 2915-25 ft. Harvey and Henderson, Salinas 1, Sacagosa grant, td 1705½ ft, 5½ in at 1700 ft, sand 1650-60 ft, good odor no color, t/cole snd 810 ft. Magnolia, Fee-Guerra 1, Farias grant, flowed 35 bbls dist, 2½ hrs, through 2½ in tubg, ½ and ⅝ in ch, tp 2100, cp 2160, bldg tanks. Sun Oil, Olivares 1, sec 239, dr 3265 ft; Speer 1, sec 274, dr 1700 ft. **Webb**—Killiam, Bruni 1, Albercas grant, set sur csg. Mac-Bill Oil Co., Trafton 1, sur 281, spud and set sur csg. **Zapata**—Thompson, Ramirez 1, Porc. 18, dr 750 ft.

CORPUS CHRISTI DISTRICT

Housh and Thompson, Kent-Crane 1, Hollis sur, dr 5450 ft. **Bee**—Aid, Hall 2, Kerr sur, set sur csg, woc. Chapman Minerals, Ablinger 1, J. Ryan sur, prep sp. Mayo, Bunn & Chapman Minerals, Sparkman 1, Walker sur, spudding. Pettus Oil & Ref. Co., Ray 1, Mangum sur, td 4305 drld to Yegua sand, abnd. **Calhoun**—Hiawatha, Roemer Est. 2, Ogsberry sur, dr 8215 ft. **Goliad**—Sun Oil, Shaper 1, Payne sur, dr below 7481 ft. Steinberger Pet. Corp., Alberecht 1, Hancock sur, crg 2335 ft. **Hidalgo**—Harding, Card 1, Canal subd, dr hard sh 6897 ft. Phillips, Flores 1, Porc. 39, dr 8607 ft. Smith, Fairbanks & Young 1, Smith subd, td 2550 ft, standing, sh with odor 2537-50 ft. **Jackson**—Chapman Minerals Corp., Bennett Ranch 1, Garcia sur, dk, wor. Texas Co., Weed 1, Newell sur, dr below sur csg. **Jim Wells**—Humble Oil & Ref. Co., Belitz 1, Stanfert sur 202, coring sh 4740 ft. Magnolia Pet. Co., Garcia 1, La Anima Sola grant, dr 7650 ft. Magnolia Pet. Co., Moreno 1, Trinidad grant, spud. Presnall & Tsesmelis, Hoffman 1, Presenas usr, dr 2665 ft. Reese & Dunn, Stillwell 1, Collins usbd, td 5363 ft, cleaning into pits, making ww and oil, perf 5304-12 ft. Shell Pet. Co., Von Blucher 1, Best sur, td 7318, still fishing. Transwestern, Dunlap 1, Seeligson ranch, td 5178 ft, woc, set 7 in csg at 5178 ft, for protection. **Kleberg**—Pure Oil Co., State of Texas 1, tr 522, td 9223 ft, sd/tr 8268 ft, dr to 8281 ft, ran straight hole sur, prep dr ahead. **Lavaca**—Midway Oil & Roy. Co., Graff 2, Jack sur, dk. **Live Oak**—Adair, Schultz Livestock 1, Pearce sur 134, dr below 2000 ft. Roy Gaines, Great Southern 2, Buchanan sur, dr 795 ft. Holland Oil Co., Wallace 1, Geo. West Ranch, td 200, still ru heavier rig. Fred P. Schwab, Terrell 1, Henry sur, dr below sur csg. Wallace & Jones, Burrows 1, Smith sur 138, dr 2865 ft. Wellington Oil Co., Sanger 1, TT RR Co. sur, 3520 ft, d & a. **Nueces**—Phillips Pet. Co., Mastin 1, Brainiger subd, dr below 4536 ft. The Texas Co., Little et al 1, Little sur 59, coring 5795 ft. **Refugio**—Austin Corp. & Heard, Hunsdon 1, Lopez sur, dr below sur csg. Coronado Oil Co., Rooke 3, Aldrete grant, dst 5902-07 ft, failed, tool would not open, dst 5907-12 flowed oil in 24 min, rec 40 ft water, core to 5920 ft, td in sh, running csg. Corpnado, Spaulding 1, Aldrete grant, dr 5705 ft. Darby Pet. Co., Rooke 1, Cobian sur, ru. Coty, Heard-Austin Corp., Peck 1, Lopez sur, td 6500 ft, cleaning out. **San Patricio**—Crote, Carlock 1, Taley sur, dr ahead 2150 ft. Illinois Pet. & Leon Dunn, Wilson 1, Morris sur, td 5883 ft, reaming to take another core, 3 dst attempted 5794-97 ft, all failed. recovered only mud.

TEXAS GULF COAST

Brazoria—General Crude's Campbell 1, se flank of West Columbia, J. H. Bell sur, dr shale 2655 ft. Normandie Oil Co.'s Ramsey 1, Iowa Colony area, H. T. & B. sur, dr shale 2865 ft. Sterling's Kramer 1, flank test at Stratton Ridge, T. W. Grayson sur, tested salt water 4325 ft. **Chambers**—Salt Dome's Ogden 1, s of Annhuac, E. Douthit sur, dr shale 7834 ft. F. A. Gillispie's Kirby Pet. Co. 1, West Cotton Lake area, flowing oil and wash water, 6434 ft. **Galveston**—Midwest Royalty Corp.'s L. Lobit 1, League City area, Perry & Austin sur, dr shale 8600 ft. Sun's Humphreys 1, Bolivar prospect, R. Barrow sur, dk. **Harris**—Continental's Sweeny Estate 1, Ogburn sur, W. C. R. R. sur, dr shale 4830 ft. **Jefferson**—Humble's McFaddin-State B-13, McFaddin Beach prospect, in Gulf of Mexico, ru. **Montgomery**—C. G. K. M. Oil Co.'s Floyd Oil Co. 1, sw of New Caney, W. C. R. R. sec 11, abn 6608 ft. Deep South Pet. Co.'s Foster Lbr. Co. 1, ne of New Caney, Pryor Bryan sur, dr shale 6570 ft. Frazier & Bunte's Chase National Bank 1, sw of Conroe, D. Garrett sur, dr shale 6756 ft. D. B. MacDaniel's Flemming 1, sw corner of county, T. J. Randall sur. Mills Bennett's Lewellyn 1, sw of Conroe, A. Hodge sur, dr shale 5770 ft. **Orange**—Sun's Lutcher Moore 1, n of Orange, B. Johnston sur, fsh 7288 ft. **Wharton**—Western Gulf's Rust 1, nw of Wharton, A. Jackson sur, abn 6120 ft.

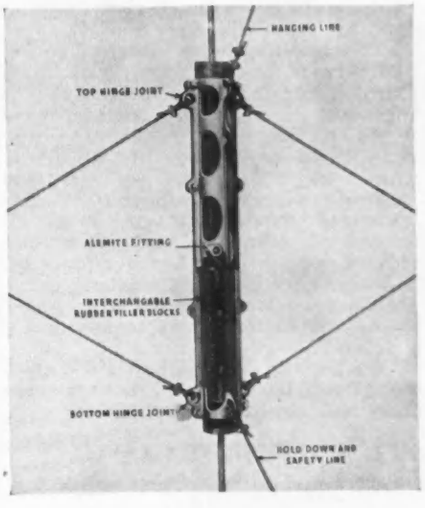
UTAH

Grand—Cane Creek Oil Co.'s Government 1, nw sw 31-26s-21e, sd 1810 ft, td, mi 8¼ in csg, good so. Columbia Crude Corporation's Rath-Government 1, ne sw 12-25s-20e, dr 4110 ft salt.

WYOMING

Big Horn—V. M. Kirk's Frisby 1, ne sw ne 11-49n-94w, woc 12½ in csg. **Carbon**—Cunningham Oil Co.'s Wolfe-Union Pacific 1, se nw sw 7-33n-78w, dr 650 ft. **Fremont**—Yellowstone Oil Co.'s Government 1, sw ne sw 27-38n-93w, dr 740 ft. **Sublette**—Frontier Petroleum Co.'s 1, se se sw 1-28n-114w, dr 5902 ft with est 3,000,000 cu ft gas fromt his depth. Wyoming Petroleum Co.'s Budd 1, cne ne 10-29n-113w, dr 1000 ft, sg.

Drilling 10th well without replacement



One large Company has finished nine wells and is now drilling its tenth, with the Patterson-Ballagh Wire Line Guide, using its original rubber refills, which are still good for several more wells.

PATTERSON-BALLAGH WIRE LINE GUIDES

PATTERSON-BALLAGH CORP.

Plant and General Offices: 1900 E. 65th St., Los Angeles, Calif. • Mid-Continent Office: 1507 Maury St., Houston, Texas • New York Office 39 Cortlandt St., New York City

NEW PRODUCTS FOR THE FIELD
Machinery • Tools • Equipment

ARC WELDER
General Electric Company

A new 150-ampere alternating-current arc welder of the transformer type has been developed by General Electric Company, Schenectady, New York, for low-current welding with heavily-coated alternating current arc-welding electrodes. While it is chiefly intended for use on light-gage metals, its wide welding range—35 to 180 amperes—permits its use on fairly heavy materials as well.

With this type of equipment, power costs are reduced approximately 50 percent as compared to welders of the rotating type. In addition, it avoids troublesome arc blow, sometimes experienced with direct current welders, thus reducing the number of rejects to a considerable extent and avoiding the necessity of reworking welds.

The new equipment is built with woven, spun-glass, fireproof insulation which prevents damage from heat on heavy overloads. Solidly brazed internal connections eliminate the possibility of open circuits. Continuous, stepless current control is obtainable by means of a hand-crank. This arrangement gives accurate adjustment of the welding current to suit fine work. Adjustment can be obtained at any time without interrupting the arc or opening any electrical connections.

A choice of two open-circuit voltages (80 and 100 volts) is provided to handle all types of a-c electrodes. The welding lead can be quickly and easily connected to either tap by means of a taper-bored connector. A circular cover plate over the terminals prevents chance contact with the terminal (or terminals) not being used. Easy portability is provided by casters or by means of a hoist sling over the hand-crank.

The equipment meets the rigid requirements of the latest standards of Underwriters' Laboratories, Inc., and is listed under their Re-examination Service.

BELL AND SPIGOT CASING
Jones & Laughlin Steel Corporation

With the initial shipment to users in the oil fields, the Jones & Laughlin Steel Corporation, Pittsburgh, announces the addition of a seamless bell and spigot casing to its present line of oil country products. This casing, made for welding in the well, features exclusively a die forged bell.

This new type bell is formed by upsetting the casing instead of by the conventional expansion operation. This die forging operation forms a heavier bell wall, increases the effective welding area and assures a concentric correct diameter which by its uniformity makes possible easy stabbing and helps to maintain true alignment of the bell and spigot during welding.

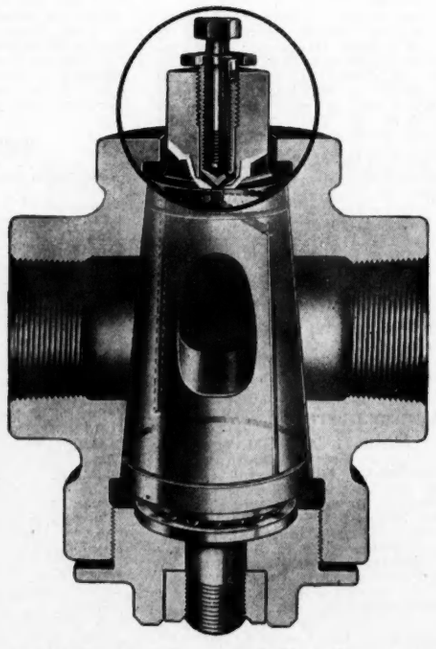
The die forging operation also provides a gentle slope or shoulder from bell to pipe wall which aids in relieving internal stresses arising from expansion during welding and transmits loads away from the joint while in service. In addition, the steel used in the manufacture of the new casing is of a grade especially selected for its welding properties.

A series of full section tensile tests show that in a majority of cases the joint strength was as great as the pipe itself, with joint efficiency records ranging between 96 percent and 100 percent. The new J & L bell and spigot casing will be available in sizes ranging from 5½ inches, O. D., to 10¾ inches, O. D., inclusive.

Loading the first shipment of the new type bell and spigot oil well casing, developed and manufactured exclusively by Jones & Laughlin Steel Corporation, Pittsburgh. The bell, formed by a die forging operation, has many advantages over conventional expanded type bells, and the pipe is made of especially selected steel.

DEVICE FOR PLUG VALVE LUBRICATION
MacClatchie Manufacturing Company

MacClatchie Manufacturing Company, Compton, California, has recently placed on the market a new device which eliminates gas or fluid leakage during plug valve lubrication This exclusive feature known as "Lubricheck," is standard equipment on all new "Hydro-Seal" plug valves, and according to the manufacturer is the only mechanical means of plug valve lubrication on the market. It is especially designed to give longer wearing life to the valve through positive lubricating action and simple operation, and to eliminate the danger of regreasing plug valves under pressure.

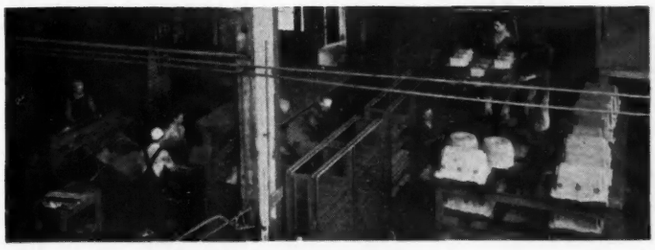


MacClatchie "Lubricheck" for Plug Valve Lubrication.

"Lubricheck" consists essentially of a tapered seal which seats against the opening of the lubricating chamber and closes off all gas or fluid while the lubricating screw is removed. The tapered seal is equipped with left-hand threads on its outer surface, and less than a quarter turn tightens the seal against the seat. As the right-hand lube screw, located inside the seal, is removed, the friction obtained serves to further tighten the seal against the seat, thus making possible a fluid-tight seal even under extremely high operating pressures. To lubricate, a grease stick is inserted, the lube screw replaced and tightened. Turning to the right automatically loosens the seal of the "Lubricheck" and opens the grease channels. Grease is then forced into the

Liner Cores, after forming in a metal core box over a reinforcing steel rod, are loaded onto dryers with machined grooves and sent to the core oven where they are baked. The ovens have automatic time and temperature control equipment.

AXELSON LINER LIFE starts with a good sand core



Every precaution must be used in handling cores from core room to core ovens. Loss of shape or form would result in faulty or imperfect castings.

Molding sand used for casting liners is mulled by running over large heavy rolls that coat the sand grains with clay and produces a sand with high bonding strength.

Specially designed machines utilizing aluminum patterns, making the liner molds. Hydraulic vibration assures perfect packing of the sand in the molds.

After the molds have been made, sand cores are placed in position, the copes (upper half of molds) are put on, and a strainer core is placed in the molten metal passage.

Some idea as to the volume of liner pouring done at one time may be obtained from this general view of the liner casting department, foundry floor.

Casting defects will occur if the molds are poured either too quickly or too slowly. A skimmer man skims every coring ladle, preventing slag from entering the molds.

After the liner molds have been poured the castings are allowed to cool slowly to a low temperature, thus minimizing strains. The castings are then shaken out of the molds.

In the case of liners, the core is truly the best part of the mold. Strange as it may seem, one of the most important factors in preparing good cores is the use of cereal which, together with linseed oil, is used for a binder. Cores which form the liner bore when the molten metal is poured into the flasks must be strong, gas-free, and have sufficient venting power to permit mold-generated gases to escape freely. Cores formed over a reinforcing steel rod are thoroughly baked in core ovens and are then ready for the actual placing in the molds. In preparing cores, conditioning molding sand, making the molds and pouring the metal, every operation is under the constant supervision of workmen trained for years in Axelson's exacting standards of quality, workmanship and pride of accomplishment. Everywhere along the line, operations, practices and work are checked for faithful adherence to rigid standards. Here is one of the many reasons why Axelson Pump Liners and Axelson Pumps are giving satisfactory service throughout the oil fields of the world and why you, too, will say that they meet every production requirement.

THERE IS NO ECONOMICAL SUBSTITUTE FOR QUALITY

AXELSON

DEEP WELL PLUNGER PUMPS · SUCKER RODS

AXELSON MANUFACTURING COMPANY — P. O. Box 98, Vernon Station, Los Angeles • St. Louis • 50 Church Street, New York • Tulsa

Mid-Continent and Eastern Distributor: Frick-Reid Supply Corporation

Rocky Mountain Distributor: Great Northern Tool & Supply Company

Foreign Representatives: "COSMOS" Soc. in Nume Colectiv, Bucharest, Roumania • *Direct Factory Representative,* Bucharest, Roumania • Industrial Agencies, Ltd., San Fernando, Trinidad, British West Indies

Factory Representative, Maracaibo, Venezuela • Armco International Corp., Buenos Aires, Argentina

channels and lubricates the entire body and plug of the valve.

Simple construction of "Lubricheck" eliminates quick wearing parts which often do not thoroughly seal off the grease chamber and therefore allow line pressure to force the grease out of the valve when lubricating. No sand or mud can interfere with proper operation of the "Lubricheck," and quick easy adjustment, or complete removal, of the lube screw can be accomplished with no gas or fluid leakage.

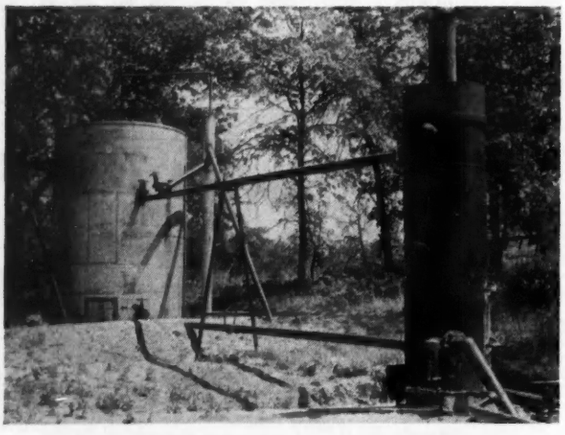
DOUBLE-UNIT TREATING SYSTEM

Black, Sivalls & Bryson

Black, Sivalls & Bryson, Oklahoma City, Oklahoma, is offering a new double-unit treating system incorporating several new advantages.

Incorporated in the new device is an efficient heater, removed from the treating tank, for heating thermosiphon fashion and reduces fire hazard and repair costs; a wash tank to fit fluid volume and treating conditions, with ingenious built-in partitioned inside flume and inverted sloping pan baffles for prolonged washing and more efficient treating.

The double-unit treating system, among other advantages, is designed to minimize evaporation losses by treating under pressure. The treating tank may be equipped with either a flat bottom or coned deck for low pressure treating (16 ounces), or with flanged and dished heads for high pressure treating (25 pounds).

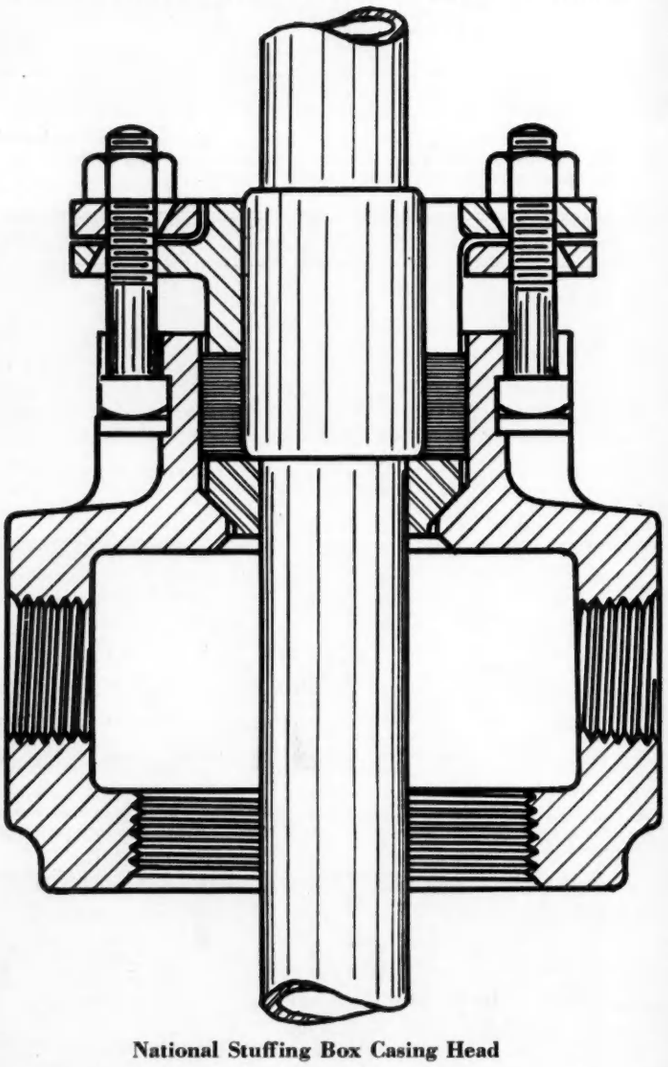


Black, Sivalls & Bryson Double-Unit Treating System

STUFFING BOX CASING HEAD

The National Supply Company

A stuffing box type casing head for the shallower fields where secondary recovery is being carried on is described in a recent bulletin of The National Supply Company. The National Type "B" Stuffing Box Casing Head is designed to support a string of tubing under conditions where an efficient packing is required to maintain either pressure or vacuum between tubing and casing. It is available in sizes from 4-inch pipe up to 7-inch API casing.



National Stuffing Box Casing Head

The body is designed to support the tubing with a high factor of safety and is built for 500 pounds working pressure. The opening through the body is of ample diameter and is beveled to pass tubing couplings. The tubing coupling is supported on a split steel seat at the lower end of the stuffing box. The seal is effected by means of a one-piece split rubber packing between the coupling and the body. The construction, in addition to packing the joint, also grips the tubing coupling and prevents straining the supporting threads should the tubing connections above be damaged by failure of the pumping jack, fire, or other external forces. The packing gland is also split, with overlapping ears so arranged that the two bolts hold the halves of the gland together. The bolt slots are so constructed that the bolts may be inclined and the gland raised for repacking without removing the nuts from the bolts.

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This Week with the Industry's EQUIPMENT SUPPLIERS

Clark Brothers Announces New Technical Service Division

J. B. O'Connor, vice president of Clark Bros. Company, Olean, New York, has announced the formation of a new department of the company to be called the Technical Service Division. This department will correlate the field and shop engineering of the company, and have charge of all process design problems, making a study of the various oil production and refinery problems so that the equipment manufactured by the company will be designed to suit the customer's process.

The department will be in charge of F. W. Laverty, who has been associated with the company for 12 years, and is considered one of the outstanding men in the field of thermodynamics. He will have associated with him in his Olean office, Dr. T. J. Chrzan and W. D. Bathurst.

At the company's Tulsa office the department will be under T. C. Webb, who formerly was associated with the Bureau of Mines, and has also had considerable experience in the design of natural gasoline recovery plants.

F. J. Jobst will represent this department in the company's New York office. H. J. Turner, formerly with the C. F. Braun Corporation, a new addition to Clark Brothers staff, will be located at Dallas.

Glen Myers Joins Basic Industries, Inc.

Glen Myers, who for the past 8 years has been a member of Shell Petroleum Corporation's production department in New Mexico, Oklahoma and Texas, has become associated with Basic Industries, Inc. Myers will make his headquarters at the concern's Houston office.

Basic Industries, Inc., handles a line of both domestic and imported oilfield equipment, representing a number of foreign interests. The concern also does cargo brokerage and inspection, as well as petroleum engineering service.

A. C. Seyfarth New International Harvester Advertising Manager

Retirement of Frank W. Heiskell as advertising manager of International Harvester Company, after 45 years of service with that company and McCormick Harvesting Machine Company, has been announced by C. R. Morrison, vice president. Heiskell has been succeeded as advertising manager on October 1 by A. C. Seyfarth, at present assistant advertising manager.

Seyfarth, widely known in the advertising profession, entered the employ of International Harvester Company in 1904 after attending the University of Michigan and the University of Chicago, and after working for a short time as an advertising solicitor. His first job with the company was as a catalog writer. Successive promotions advanced him to chief catalog writer and copy chief, where he was in charge of all advertising copy production. He became assistant advertising manager in 1913.

A. C. SEYFARTH
Advertising Manager, International Harvester Company.

Heiskell's entire business career was given to the service of McCormick Harvesting Machine Company and the International Harvester Company. On August 1, this year, he rounded out his 25th year as advertising manager of the Harvester Company.

Ash Grove Company Appoints Heisler Special Representative

John T. Heisler has been appointed special oil-field representative for the Ash Grove Lime & Portland Cement Company, Kansas City, Missouri. His present headquarters will be at Great Bend, Kansas. For the past 12 years, Heisler has been engaged in the retail building material business in most of the leading fields in Kansas and Oklahoma, and has a wide acquaintance throughout the oil industry.

J. B. O'Connor Elected to S. R. Dresser Board

J. B. O'Connor, vice president and general sales manager, Clark Bros. Company, Olean, New York, has been elected to the board of directors of S. R. Dresser Manufacturing Company, Bradford, Pennsylvania, according to a recent announcement by H. N. Mallon, president.

O'Connor has been associated with Clark Bros. since 1927, entering the firm as sales representative, and later advancing to the position he now holds.

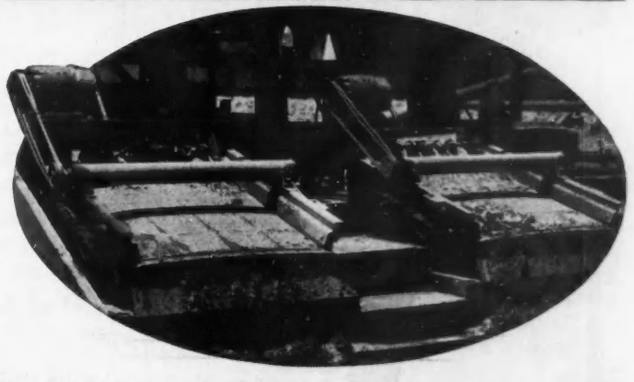
Ajax Iron Works Celebrates 60 Years of Colorful History

The colorful history of the oil industry is reflected in that of many of its pioneer companies—including Ajax Iron Works, which is commemorating the passing of 60 years of steam drilling engine manufacture with an interesting 4-page bulletin.

Begun in Corry, Pennsylvania, in 1877, by a partnership of C. G. Harmon, G. H. Gibbs, F. L. Bliss and C. H. Bagley, the manufacture of the new Ajax steam engine was conducted in a specially built, 50 x 120, 2-story building, with the second story occupied by the Harmon Opera House. One or another of the partners from time to time spiced his manufacturing experience with management of the theatre, and

LINK-BELT MUD SCREENS
Quickly Save their Cost

● This Link-Belt dual vibrating screen hook-up is taking shale and other abrasive materials out of drilling mud. Besides keeping destructive materials out of contact with pump parts, thus vastly reducing pump maintenance, a valuable saving in the cost of mud alone is made. For the most efficient, dependable, economical method of reconditioning rotary mud—specify Link-Belt screens. 7541

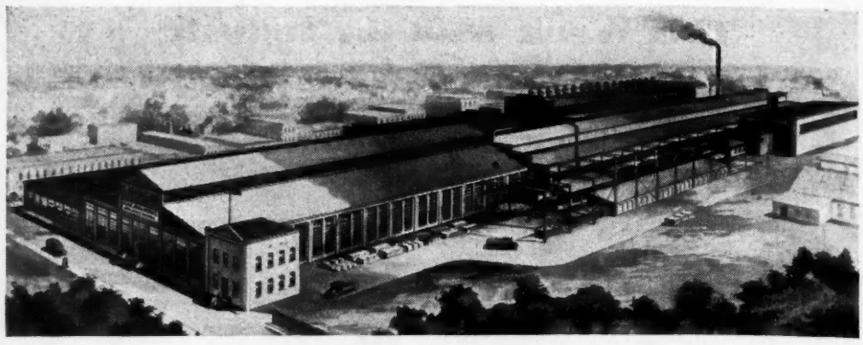


LINK-BELT COMPANY, Philadelphia, Houston, Tulsa, Dallas, Los Angeles, Indianapolis, Chicago, New York. Distributors in all fields.

LINK-BELT Vibrating SCREEN

it must have seemed to these young men that the problems of the heroine, bound to a rail with the express train tooting 'round the bend, were small compared to those in their own daily activities.

Competition was bitter, the bottom had fallen out of prices in the oil industry, and to top things off, when Bliss invented and patented his successful rigged reverse by which action of the link was controlled by a line of small gas pipe running to the derrick—



Ajax Iron Works plant at Corry, Pennsylvania.

every other engine manufacturer in the field promptly appropriated it. Several hard years of lawsuits elapsed before the infant company derived any benefit from the invention, but after a strenuous fight which ended only at the Supreme Court, the partners were victorious.

It took an excursion in the grand manner to Niagara Falls to properly celebrate the event. A special train was chartered for all employees and their families, and the jubilation was immense.

From that day on, the fortunes of the company took an upward turn. Having begun with the manufacture of an 8 x 12 engine with a prodigious 12 horsepower (quite ample for the shallow wells then drilled), the concern progressed steadily to larger engines, even more finely made; to interchangeable parts and methods well in advance of the times.

In 1892 the company was incorporated under its present title, and in 1909 The National Supply Company became exclusive sales representatives of Ajax Iron Works.

In 1920 the growth of rotary drilling called for more powerful engines, delivering smoother power than ever before. Ajax Iron Works responded with the Ideal-Ajax Twin Engine, and from that day to this has originated many major improvements in drilling engine design. Methods and equipment kept pace with the demand for finer performance; the Ajax shops are models of efficient production, where specialized experience goes hand-in-hand with modern ideals of precision.

Many of the early Ajax engines are still in daily service, quaint in appearance beside the mighty latest Ideal-Ajax products, but proving their sound and honest construction still. Today, Ajax steam drilling engines are found in every oil field on earth . . . built in all sizes from 7 to 14-inch . . . and are the products of the world's largest exclusive manufacturer of steam drilling engines.

"Practical Accounting for Oil Producers" by Robt. M. Pitcher

The need for a practical reference text book devoted to the subject of oil production accounting has been recognized for many years by both producers and accountants. For the purpose of meeting this need, Robert M. Pitcher has spent many months in preparing a book entitled "Practical Accounting for Oil Producers," which contains a non-technical, comprehensive treatment of the accounting problems peculiar to the oil producing industry. Pitcher has spent 18 years actively engaged in various branches of the petroleum industry. His experience has been such as to bring him in close contact with the accounting division of the business, giving him an understanding of accounting problems as they appear to both an executive and an accountant.

ROBERT M. PITCHER

Prior to his connection with the petroleum industry, Robert M. Pitcher had earned an enviable reputation as a public school teacher. He has written text books on arithmetic that have had extensive use.

"Practical Accounting for Oil Producers" is written from the point of view of the oil man. It is written in plain, easy-to-understand language. Every principal feature of oil production accounting is covered. Only recognized accounting principles and sound practice are presented throughout this book. Illustrations of practical forms are given wherever they will assist in a clear discussion of various accounting records.

The book is published by The Mid-West Printing Company of Tulsa, Oklahoma.

Baker Goes to South America For American Rolling Mills

James H. Baker has resigned as sales engineer for Merco Nordstrom Valve Company and Pittsburgh Equitable Meter Company to become associated with Armco International Corporation, export subsidiary of American Rolling Mill Company, Middletown, Ohio. He will be stationed at Port of Spain, Trinidad, B.W.I.

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STANDCO BRAKE LINING
Nothing novel—no bunk—but it gets the job done without scoring brake rims. See page 1940, Composite Catalog.
Standard Brake Lining Co.

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Shallow Rotary 2-pays Blk Ac 4 test offset 3 wells, last 80 bbls 1274 feet. Indicated Woodbine 2200 Gusher Gas Oil. 3300 acres in escrow contracted. Half Interest, take $3,500 to finish. ACT QUICK.—J. R. Ferguson, Temple, Texas.

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Squeaks from the Bull Wheel

He Knows

"Johnny! Can you tell me what a waffle is?"

"Yes'm: it's a pancake with a non-skid tread.

An Omission

A London welfare club gives an annual bathing outing to newsboys.

Said one: "I say, Bill, ain't you dirty!"

Bill: "Yes, I missed the train last year."

Only Too True

"How do you manage to persuade your husband to buy you such expensive hats?"

"I take him shopping with me, walk him around until he can't stand, and then wind up in a hat store. He'll buy anything to get home."

The Only Employe

"You have been with that firm a long time."

"Yes."

"What's your position?"

"I'm an employe."

"But what is your official title?"

"I haven't any official title. It's like this: When the proprietor wants something done he tells the cashier, and the cashier tells the bookkeeper, and the bookkeeper tells the assistant bookkeeper, and the assistant bookkeeper tells the chief clerk, and the chief clerk tells me."

"And what then?"

"Well, I haven't anybody to tell, so I have to go and do it."

Salesman

"How do you sell these ties?"

"I don't know. I often wonder myself."

Making Allowances

"What's the great hurry, old man?"

"I'm going to the airport to catch the 4:30 plane."

"There's no hurry; it's only 3:30 now."

"I know that, but I always have to figure on a few chumps stopping me to ask why I'm hurrying."

A New Definition

"What's an expert, Daddy?"

"He's a fellow who gets a big salary for telling other people how to do things he can't do himself."

When Words Fail

The golfer stepped up to the tee and drove off. The ball sailed straight down the fairway, leaped onto the green and rolled into the hole. The golfer threw his club in the air with excitement.

"What have you suddenly gone crazy about?" asked his wife, who was trying to learn something about the game.

"Why, I just did a hole in one," yelled the golfer, a wild gleam of delight in his eyes.

"Did you?" asked his wife placidly. "Do it again, dear, I didn't see you."

She Knows Dough

"I'm in a terrible spot. My wife doesn't know anything but one-syllable words."

"Mmm. That's almost unbelievable for a wife."

"Why?"

"Money has two syllables."

Unanimous

Warden—"Boys. I've had charge of this prison for ten years and we ought to celebrate the occasion. What kind of party would you suggest?"

Prisoners (in unison)—"Open house."

Starter

Architect: "Now, if you'll give me a general idea of the kind of house you need. . . ."

Client: "I want to have something to go with a door-knocker my wife brought home from Europe."

Bitter Memory

"I think I'll have to go downstairs and send Nancy's young man home."

"Now Elmer, don't be hasty. Remember how we used to court."

"For gosh sakes; I hadn't thought of that. Out he goes."

Modern

Social Worker—Do you owe any back house rent?

Relief Seeker—We ain't got any back house. We have modern plumbing.

Cheering

"I'm jest writin' Paw that you're sick. Does 'cemetery' begin with a 'c' or an 's'?"

Not Observant

"Who is that terribly homely man sitting over there?"

"That's my brother."

"Pardon me. I hadn't noticed the resemblance."

What They Think

What they think when little Oswald starts to school for the first time:

His mother: "Just think, my little darling is almost grown up."

His father: "I hope he makes a full-back."

His older sister: "That means I've got to walk to school with him and can't go with the kids."

His teacher: "I hope he's smarter than he looks."

His neighbors: "Thank heaven! Now we can have peace for a few hours a day."

His dog: "Yo-o-ow-l-l-l,"

Help!

"You were a long time saying goodnight to that young man. I hope you didn't let him kiss you."

"Let him. Gee, Daddy, I had to help him."

Valves

that close tightly, open easily, and stand hard service

KENNEDY Valves are popular with operating men because they seat tightly, open and close easily, and can be depended upon for many years of trouble-free operation.

Kennedy Valves and Fittings for the petroleum industry are specially designed for exacting service. Special features of design, unusually sturdy proportions, clean, sharp, true threads on screwed valves and fittings, full unobstructed passages, and a complete range of types and sizes for all the standard requirements are some of the many advantages of standardizing on Kennedy Products.

The Kennedy Valve Mfg. Co., Elmira, N. Y.

KENNEDY

VALVES-PIPE FITTINGS-FIRE HYDRANTS

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